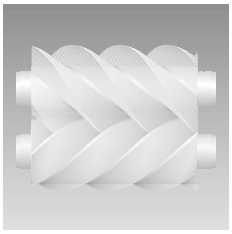

Atlas Copco Stationary Air Compressors

GA90 - GA110 - GA132 - GA160 - GA200 - GA250 - GA315
GA90 W - GA110 W - GA132 W - GA160 W - GA200 W - GA250 W - GA315 W

Instruction Book

Important

1. This book applies to the compressors from serial number **AIF-024 378** onwards.
2. This book must be used together with the "User manual for Elektronikon® regulator", printed matter no. 2920 1291 0x.

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  Any unauthorized use or copying of the contents or any part thereof is prohibited. This applies in particular to trademarks, model denominations, part numbers and drawings.

- This instruction book meets the requirements for instructions specified by the machinery directive 98/37/EC and is valid for CE as well as non-CE labelled machines

No. 2920 1251 02

Registration code: APC G ≥ 90/'99 / 38 / 995
Replaces 2920 1251 01

2000-01

جهان کمپرسور
Jahan Compressor

This instruction book describes how to handle the machines to ensure safe operation, optimum efficiency and long service life.

Read this book before putting the machine into operation to ensure correct handling, operation and proper maintenance from the beginning. The maintenance schedule comprises measures for keeping the machine in good condition.

Keep the book available for the operator and make sure that the machine is operated and that maintenance is carried out according to the instructions. Record all operating data, maintenance performed, etc. in an operator's logbook available from Atlas Copco. Follow all relevant safety precautions, including those mentioned on the cover of this book.

Repairs must be carried out by trained personnel from Atlas Copco who can be contacted for any further information.

In all correspondence mention the type and the serial number, shown on the data plate.

For all data not mentioned in the text, see sections "Preventive maintenance schedule" and "Principal data".

The company reserves the right to make changes without prior notice.

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1 LEADING PARTICULARS

1.1 General description

GA90 up to GA315 and GA90 W up to GA315 W are single-stage, oil-injected screw compressors, driven by an electric motor and enclosed in a sound-insulated bodywork.

GA90 up to GA315 are air-cooled, abbreviated as "GA". GA90 W up to GA315 W are water-cooled, abbreviated as "GA W".

The compressors are available for a maximum working pressure of:
- 7.5, 10 or 13 bar(e) for 50 Hz versions
- 107, 132, 157 or 200 psig for 60 Hz versions

GA and GA W include mainly:
- Air filter(s)
- One or two compressor elements **1)**
- One or two unloaders **1)**
- Air receiver/oil separator
- Air cooler
- Oil cooler(s)
- Drive motor
- Drive coupling
- Gear casing
- Elektronikon® control system
- Safety valves

Energy recovery
The compressors can easily be provided with the Atlas Copco energy recovery systems to recover the major part of the compression heat in the form of hot water.

Heavy-duty filters
A heavy-duty filter kit is available as option allowing the compressor to operate in heavily contaminated surroundings.

Oil/water separation
Atlas Copco has oil/water separators (type OSM), especially designed for GA/GA W compressors, to separate oil from condensate to meet the requirements of the local environmental codes.

1.2 Elektronikon® control system

1.2.1 Elektronikon regulator

1.2.1.1 Automatic control of compressor operation

The regulator maintains the net pressure between programmable limits by automatically loading and unloading the compressor. A number of programmable settings, e.g. the unloading and loading pressures, the minimum stop time and the maximum number of motor starts are taken into account.

The regulator stops the compressor whenever possible to reduce the power consumption and restarts it automatically when the net pressure decreases. In case the expected unloading period is too short, the compressor is kept running to prevent too-short standstill periods.

Warning
A number of time-based automatic start/stop commands may be programmed. **2)** Take into account that a start command will be executed (if programmed and activated), even after manually stopping the compressor.

1.2.1.2 Protecting the compressor

Shut-down
If the temperature at the outlet of the compressor elements exceeds the programmed shut-down level, the compressor will be stopped. This will be indicated on display (4-Fig. 3a) and general alarm LED (3) will blink. The compressor will also be stopped in case of overload of the drive motor and on GA also in case of fan motor overload.

Remedy the trouble and reset the message on the display before restarting. See "User manual for Elektronikon® regulator", section "Submenu STATUS DATA".

Shut-down warning
Before the shut-down level for the compressor element outlet temperature is reached, a message will appear on display (4-Fig. 3a) and general alarm LED (3) will light up, to warn the operator that the shut-down warning level is exceeded. The shut-down warning level is a programmable setting below the shut-down level.

The message disappears as soon as the cause of the trouble is remedied.

1.2.1.3 Monitoring components subject to service

The regulator continuously monitors the oil, oil filters, oil separator, drive motor grease and air filters. Each input is compared to programmed maximum time intervals or pressure drops. If these limits are exceeded, a message will appear on display (4-Fig. 3a) to warn the operator to replace the indicated component, to change the oil or to grease the motor as the case may be.

1) GA/GA W 90 up to -160 are equipped with one compressor element and unloader, all other types have two compressor elements and unloaders.

2) This funcion is called the **Timer** function. See "User manual for Elektronikon regulator", section "Submenu TIMERS".

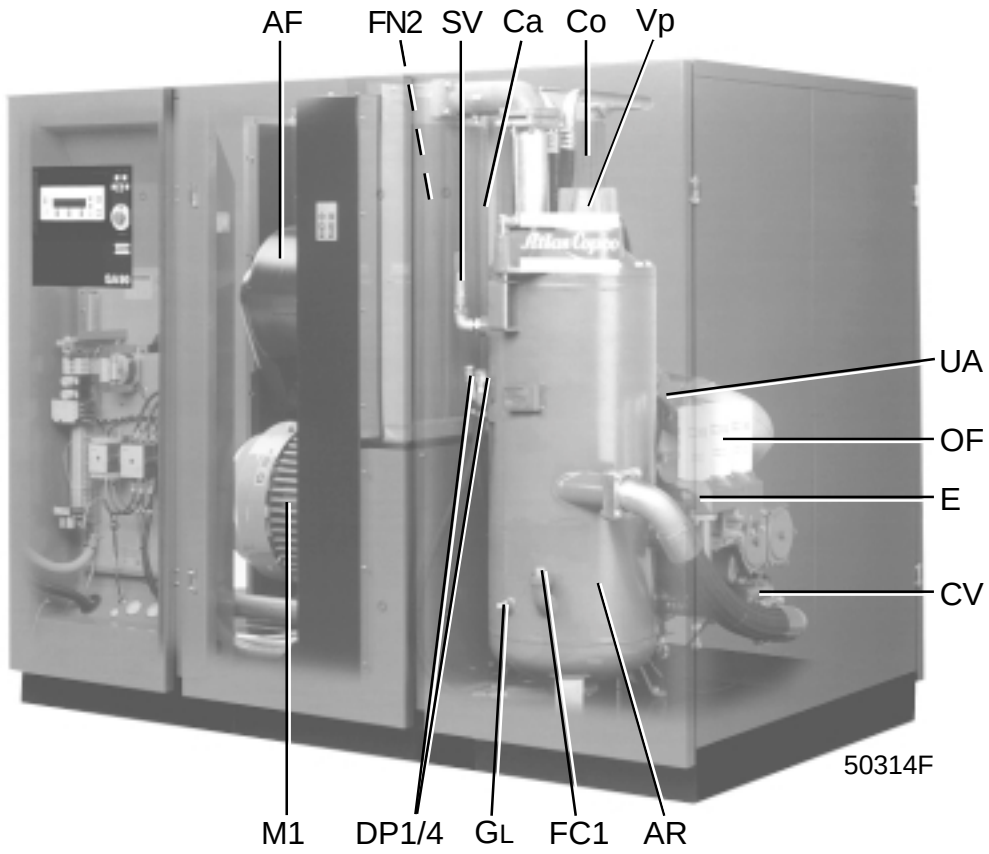


Fig. 1a GA90

AF. Air filter
AR. Air receiver/oil separator
Ca. Air cooler
Co. Oil cooler
CV. Check valve
DP1. Oil drain plug, air receiver
DP4. Oil drain plug, oil cooler
E. Compressor element
FC1. Oil filler plug
FC2. Oil filler plug (only to be used at initial start-up)
FN2. Fan
Gl. Oil level indicator
M1. Drive motor
OF. Oil filters
SV. Safety valve
UA. Unloader
Vp. Minimum pressure valve
Vs. Oil stop valve
Y1. Loading solenoid valve

Figs. 1. GA90 and GA110 W

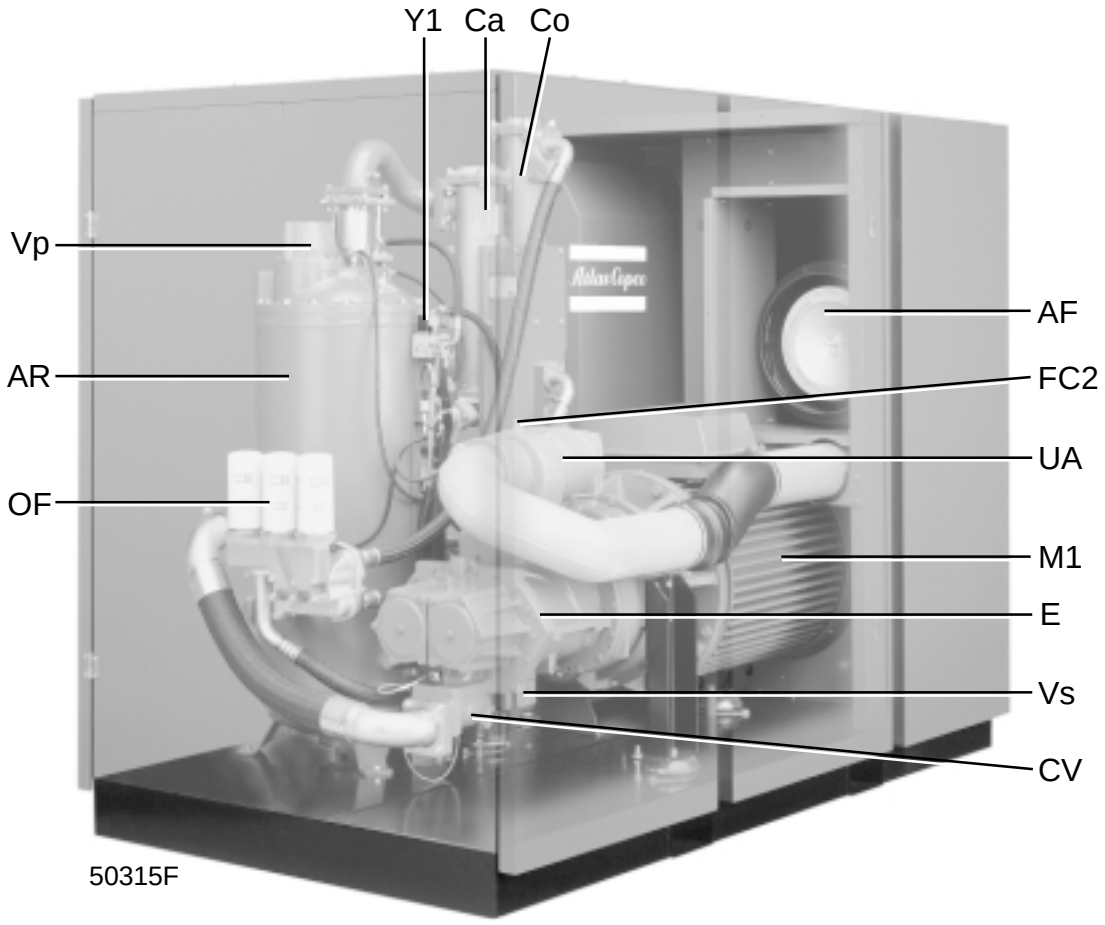


Fig. 1b GA110 W

1.2.1.4 Automatic restart after voltage failure

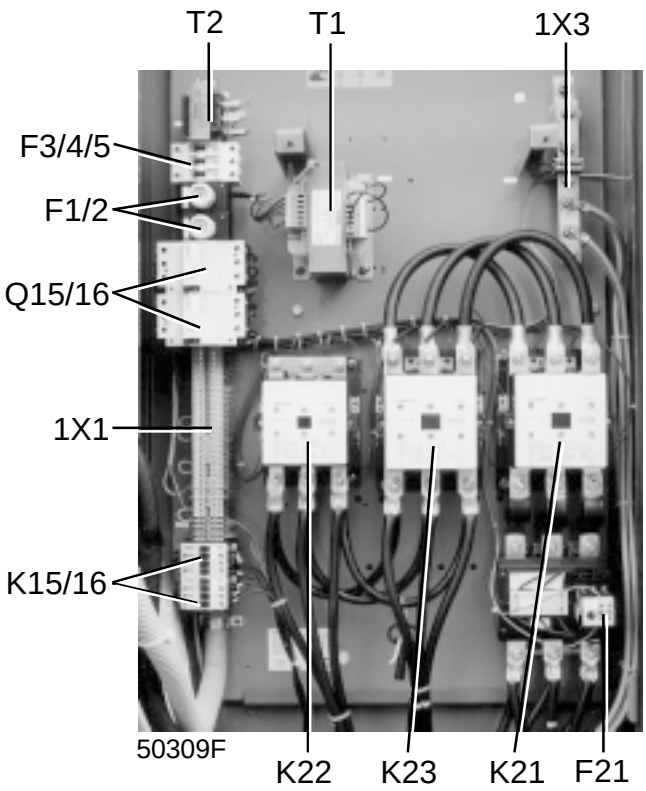
For compressors leaving the factory, this function is made inactive. If desired, the function can be activated. Consult Atlas Copco.

Warning
If activated and provided the regulator was in the automatic operation mode and the compressor control mode (local, remote 1 or remote 2 - see section 1.2.3) was not changed during the voltage failure, the compressor will automatically restart if the supply voltage to the module is restored within a programmed time period (this time period is called the **power recovery time**).

The power recovery time can be set between 1 and 254 seconds or to 0. If the power recovery time is set to 0, the compressor will always restart after a voltage failure, no matter how long it takes to restore the voltage.

1.2.1.5 Permissive start

After a start command (either automatic start by the electronic regulator or manual start), the permissive start function is operating: if the oil injection pressure at the compressor elements exceeds the programmed level, the compressor will not start (indicated as <<Start failure>>). See "User manual for Elektronikon regulator", section "Programmable settings for GA90/315".



F1/F2. Fuses
F3/F5. Circuit breakers
F21. Overload relay, drive motor (M1)
K15/16. Fan motor contactors **1)**
K21. Line contactor
K22. Star contactor
K23. Delta contactor
Q15/16. Fan motor circuit breakers **1)**
T1/T2. Transformers
1X1. Terminal strip
1X3. Earthing rail

1) One contactor/circuit breaker on GA90 and -110, two contactors/circuit breakers on GA132 up to -315, not provided on GA W.

Fig. 2. Electric cabinet (typical example)

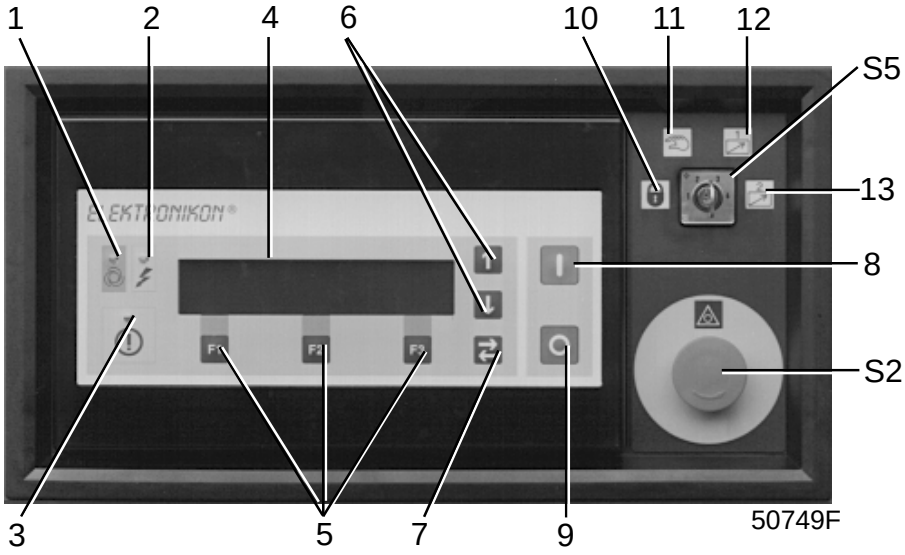


Fig. 3a. Control panel

Compressor outlet		7.0 bar
Automatically loaded		
Menu	Show More	Unload
F1	F2	F3

Fig. 3b. Example of the main display

Status data		↓
Main Screen	Select	
F1	F2	F3

Fig. 3c. Example of a main menu

1.2.2 Control panel (Fig. 3a)

Indicators, keys and buttons

Ref.	Designation	
1	Automatic operation LED	Indicates that the regulator is automatically controlling the compressor: the compressor is loaded, unloaded, stopped and restarted depending on the air consumption and the limitations programmed in the regulator.
2	Voltage on LED	Indicates that the voltage is switched on.
3	General alarm LED	Is alight if a shut-down warning condition exists. See section 1.2.1. Blinks if a shut-down condition exists, if a sensor used to protect the compressor is out of order or after an emergency stop. See section 1.2.1.
4	Display	Indicates messages concerning the compressor operating condition, a service need or a fault. See "User manual for Elektronikon regulator" sections "Submenu STATUS DATA" and "Submenu SERVICE".
5	Function keys	Keys to control and program the compressor. See below.
6	Scroll keys	Keys to scroll through the display.
7	Tabulator key	Key to go to the next field of the display.
8	Start button	Push button to start the compressor. LED (1) lights up indicating that the regulator is operative (in automatic operation). The LED goes out after unloading the compressor manually.
9	Stop button	Push button to stop the compressor. LED (1) goes out. The compressor will run unloaded for 30 seconds before stopping.
S2	Emergency stop button	Push button to stop the compressor immediately in case of emergency. After remedying the trouble, unlock the button by turning it anti-clockwise.
S5	Control mode switch	Key switch to select the compressor control modes. See section 1.2.3.

Selecting a menu
To facilitate controlling the compressor, menu-driven programs are implemented in the Elektronikon regulator. Use function keys (5) to select the menus to program and monitor the compressor. The "User manual for Elektronikon regulator" deals elaborately with all regulator functions.

Function keys
The functions of the keys vary depending on the displayed menu. The actual function is indicated just above the relevant key. The most common functions are listed below:

Designation (4-Fig. 3a)	Function
Add	To add compressor start/stop commands (day/hour)
Cancel	To cancel a programmed setting when programming parameters
Delete	To delete compressor start/stop commands
Limits	To show limits for a programmable setting
List	To list programmed start/stop commands (day/hour)

Designation (4-Fig. 3a)	Function
Load	To load the compressor manually
Main Screen	To return from a menu to the main display (Fig. 3b)
Menu	Starting from the main display (Fig. 3b), to initiate the main menu (Fig. 3c) which gives access to submenus Starting from a submenu, to return to the main menu (Fig. 3c)
Modify	To modify programmable settings
Show More	To have a quick look at the compressor status
Program	To program modified settings
Reset	To reset a timer or message
Return	To return to a previously shown option or menu
Select	To select a submenu or to read more details of a selection shown on the display
Unload	To unload the compressor manually

1.2.3 Compressor control modes

Key switch (S5-Fig. 3a) allows the operator to select four control modes:

Key position	Compressor control mode
10	**Compressor off.**
11	**Local control mode** (remote control mode is made inactive): - The compressor can only be controlled by the buttons on the control panel. - The compressor can be started and stopped via function **Timer** (see section 1.2.1), if programmed and activated.
12	**Remote control mode 1** (local control is made inactive): - The compressor can only be started and stopped by an ES100 sequence selector or by external switches. Do not use maintained-action buttons in case of remote starting/stopping. - Compressor start/stop commands via function **Timer** (see section 1.2.1) are still possible, if programmed and activated. - Emergency stop button (S2) remains active.
13	**Remote control mode 2.** The compressor can be controlled by an ES-type controller or by computer. Consult Atlas Copco.

Important
- The regulator will only react to a new control mode if the new position of the control mode switch is maintained for 3 seconds.
- To avoid unauthorized switching over to another control mode, take out the key after selecting the required mode.

1.2.4 External compressor status indication

Terminal strip (1X1-Fig. 2) is provided with auxiliary contacts for external indication of:

Indication	Relay	Terminals on strip 1X1	Max. load
Automatic operation	K06	50-51	10 A / 230 V AC
Warning	K07	52-53	10 A / 230 V AC
Shut-down	K08	54-55	10 A / 230 V AC
Control mode REMOTE 1	--	56-57	10 A / 230 V AC

Warning
Stop the compressor and switch off the voltage before connecting external equipment.

1.2.5 External communication

If it is desired to connect the compressor to an Atlas Copco ES system (e.g. to an ES100 sequence selector), an optional communication module (COM1) needs to be installed.

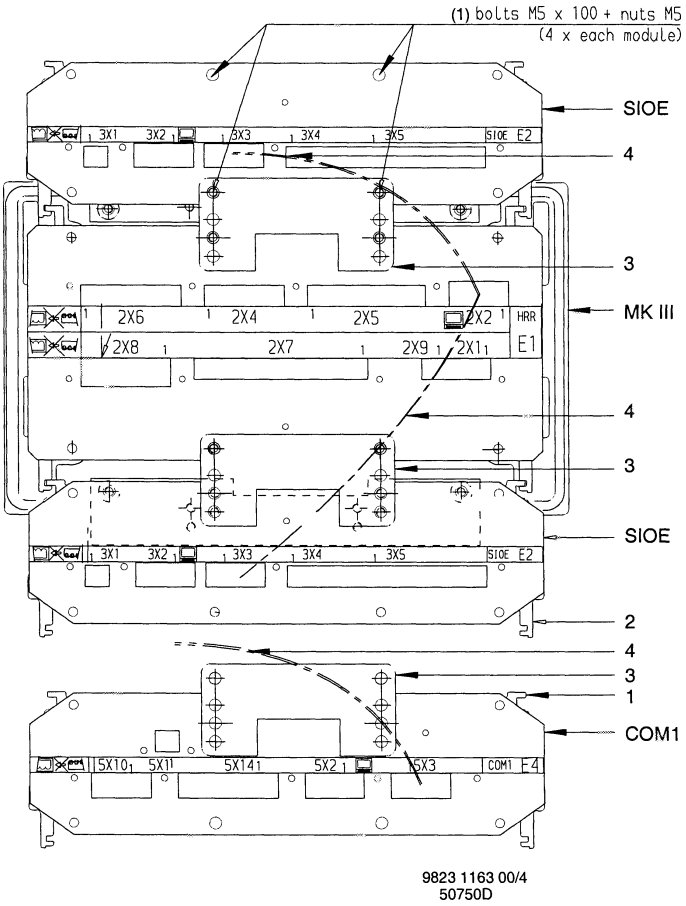
Installation (Fig. 4)

1. Fit the communication module (COM1) and fix it using plate (3).
2. Connect the 24V power supply from terminals (11 and 12) of terminal strip (1X1) to connector (5X1) of communication module (COM1).
3. Connect an earth cable between module (COM1) and the module of the regulator.
4. Connect the cable delivered with the COM1 module from connector (5X3) of the COM1 module to a free ..X2 connector on a module of the compressor regulator.
5. Consult Atlas Copco to check the installation and to have the communication software loaded.

1.3 Regulating system (Figs. 5)

1.3.1 Air flow

GA/GA W 90 up to -160
Air drawn through filter (AF) and unloader (UA) is compressed



COM1. Communication module
MKIII. Electronic regulator
SIOE. Expansion modules (upper module not always installed)
1. Guide
2. Slot
3. Plate
4. Cable

Fig. 4. Installation of communication module (typical example)

in compressor element (E). Compressed air and oil are discharged to air receiver/oil separator (AR) via check valve (CV). In the oil separator compressed air is separated from the oil. The air is blown via minimum pressure valve (Vp) to air cooler (Ca). The cooled air is discharged through moisture trap (MTa) and outlet valve (AV) towards the air net.

Check valve (CV) prevents blow-back of compressed air.

GA/GA W 200 up to -315
Air drawn through filters (AF) and unloaders (UA1 and UA2) is compressed in compressor elements (E1 and E2). Compressed air and oil are discharged to air receiver/oil separator (AR) via check valves (CV1 and CV2). In the oil separator compressed air is separated from the oil. The air is blown via minimum pressure valve (Vp) to air cooler (Ca). The cooled air is discharged through moisture trap (MTa) and outlet valve (AV) towards the air net.

Check valves (CV1 and CV2) prevent blow-back of compressed air.

All GA/GA W
Minimum pressure valve (Vp) prevents the receiver pressure from dropping below a minimum pressure. The valve has a built-in check valve.

1.3.2 Condensate drain system

A moisture trap (MTa) is installed downstream of the air cooler to prevent condensate from entering the air outlet pipe. The trap is provided with a float valve for automatically draining condensate (Daa) and with a manual drain valve (Dma).

1.3.3 Oil system

GA/GA W 90 up to -160
Air pressure forces the oil from receiver (AR) through oil cooler(s) (Co), filters (OF) and valve (Vs) to compressor element (E) and the lubrication points.

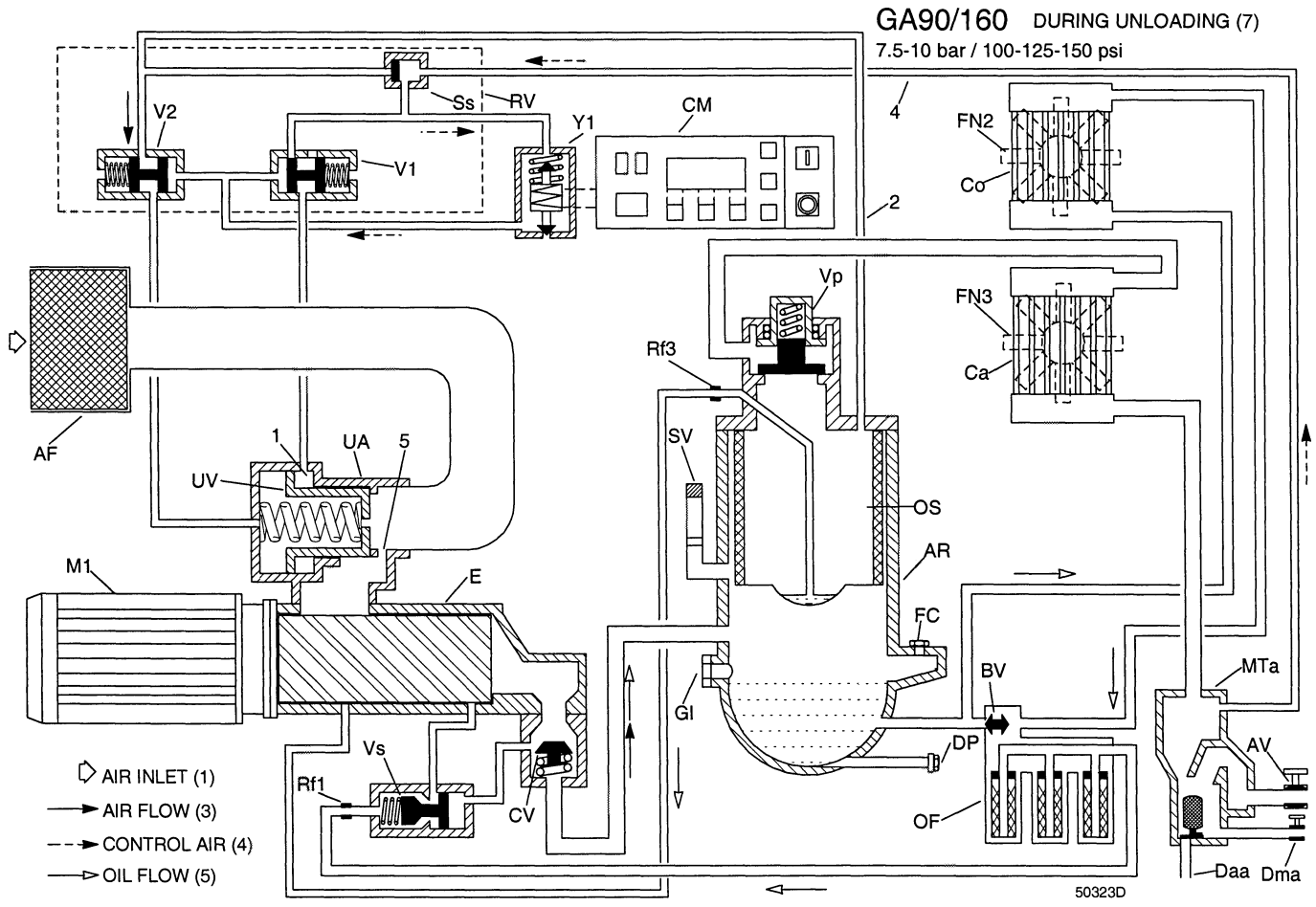


Fig. 5a GA90 up to -160 during unloading (7.5-10 bar/100-125-150 psi)

Oil stop valve (Vs) prevents compressor element (E) from flooding with oil when the compressor is stopped.

Valve (BV) by-passes oil cooler(s) (Co) when starting the compressor from cold condition to ensure rapid warming of the oil to normal working temperature.

GA/GA W 200 up to -315
Air pressure forces the oil from receiver (AR) through oil cooler(s) (Co), filters (OF) and valves (Vs1 and Vs2) to compressor elements (E1 and E2) and the lubrication points.

Oil stop valves (Vs1 and Vs2) prevent compressor elements (E1 and E2) from flooding with oil when the compressor is stopped.

Valves (BV) by-pass oil cooler(s) (Co) when starting the compressor from cold condition to ensure rapid warming of the oil to normal working temperature.

All GA/GA W
In receiver (AR) most of the oil is removed from the air centrifugally. Almost all of the remaining oil is removed by separator element (OS).

1.3.4 Cooling system

The system includes air cooler (Ca) and oil cooler (Co) (GA W 132 up to -315 have two oil coolers).

On GA, the coolers are cooled by fans (FN2/3) (GA90 and -110 are provided with one fan). GA W are provided with a cooling water system.

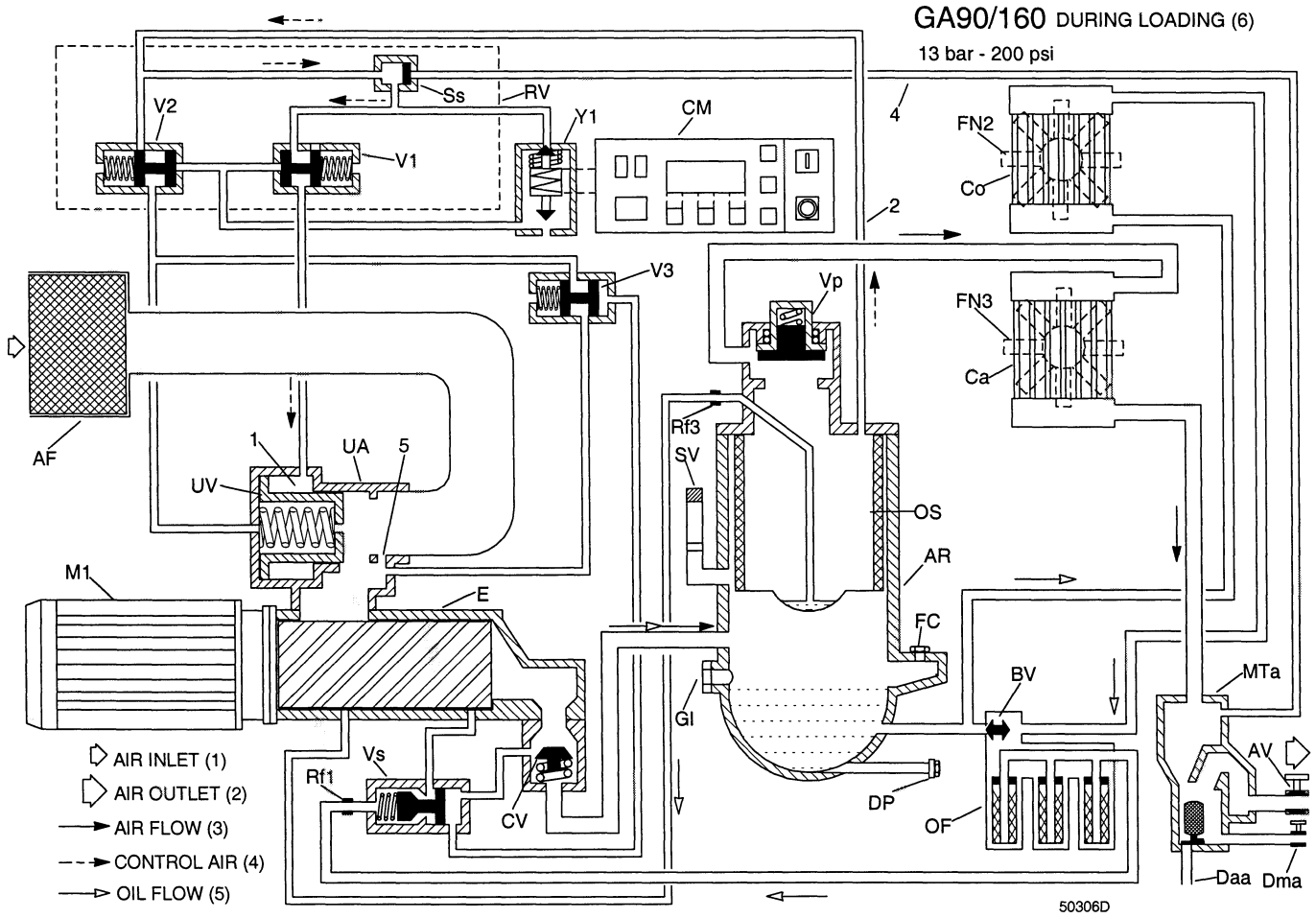


Fig. 5b GA90 up to -160 during loading (13 bar / 200 psi)

AF.	Air filter(s)
AR.	Air receiver/oil separator
AV.	Air outlet valve
BV.	Thermostatic by-pass valve(s), oil cooler(s)
Ca.	Air cooler
CM.	Elektronikon® regulator
Co.	Oil cooler(s)
CV.	Check valve
CV1.	Check valve
CV2.	Check valve
Daa.	Automatic condensate drain outlet
Dma.	Manual condensate drain valve
DP1.	Drain plug, oil
E.	Compressor element
E1.	Compressor element
E2.	Compressor element
FC.	Filler plug, oil
FN2/3.	Fans
Gl.	Oil level indicator
MTa.	Moisture trap
M1.	Drive motor
OF.	Oil filters
OS.	Oil separator element
Rf1/3.	Restrictors
RV.	Regulating valve
Ss.	Pressure selector valve
SV.	Safety valve
UA.	Unloader
UA1.	Unloader
UA2.	Unloader
UV.	Unloading valve
UV1.	Unloading valve
UV2.	Unloading valve
Vp.	Minimum pressure valve
Vs.	Oil stop valve
Vs1.	Oil stop valve
Vs2.	Oil stop valve
V1.	Control valve for unloading valve
V2.	Vent valve
V3.	Vent valve **1)**
Y1.	Loading solenoid valve
1.	Chamber
2.	Flexible, control air or blow-off air
3.	Flexible, blow-off air
4.	Flexible, control air
5.	By-pass hole, unloader

1) For GA/GA W 90 up to -160: only provided on 13 bar/200 psi versions

Figs. 5 Regulating systems

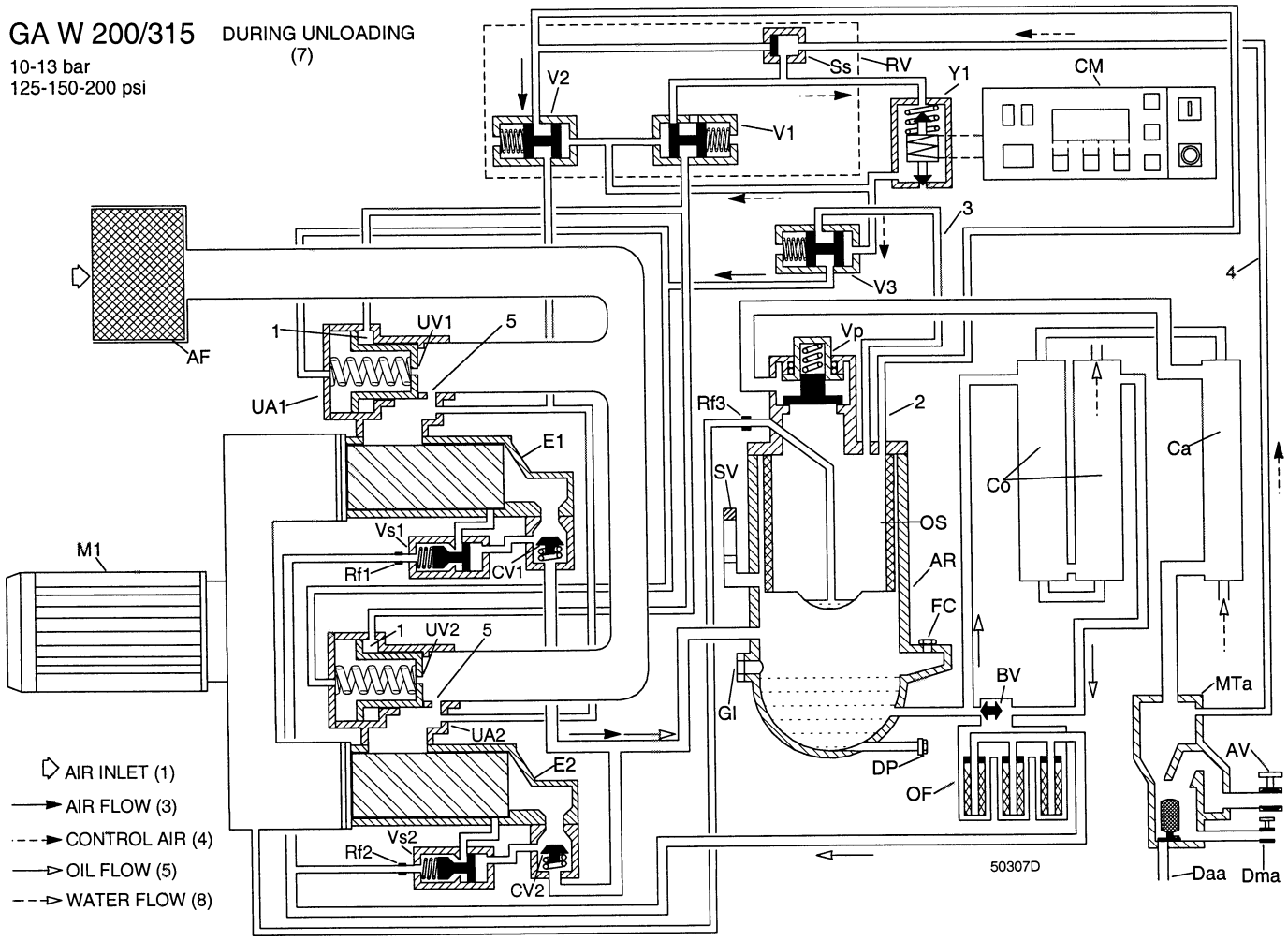


Fig. 5c GA W 200 up to -315 during unloading (10-13 bar/125-150-200 psi)

1.3.5 Regulating system

The system is controlled by Elektronikon® regulator (CM) which keeps the net pressure within programmable pressure limits by automatically loading and unloading the compressor depending on the air consumption.

1.3.5.1 Unloading

If the air consumption is less than the air delivery of the compressor, the net pressure increases. When the net pressure reaches the upper limit of the working pressure (unloading pressure), solenoid valve (Y1) is de-energized. The plunger of the valve moves downwards by spring force:

GA/GA W 90 up to -160

1. Control pressure is fed via flexible (2) and selector valve (Ss) through solenoid valve (Y1) to valves (V1 and V2).
2. The plungers of valves (V1 and V2) move against spring force.
3. Control pressure present in chamber (1) of unloader (UA) is vented to atmosphere through valve (V1). Unloading valve (UV) closes by spring force.
4. Receiver pressure is released to unloader (UA):
   - through flexible (2) and valve (V2)
   - **on 13 bar/200 psi compressors** also through valve (V3) as this valve is kept open by air from the outlet of compressor element (E)
5. As the receiver pressure decreases, selector valve (Ss) switches over.
6. **On 13 bar/200 psi compressors**, as the pressure at the

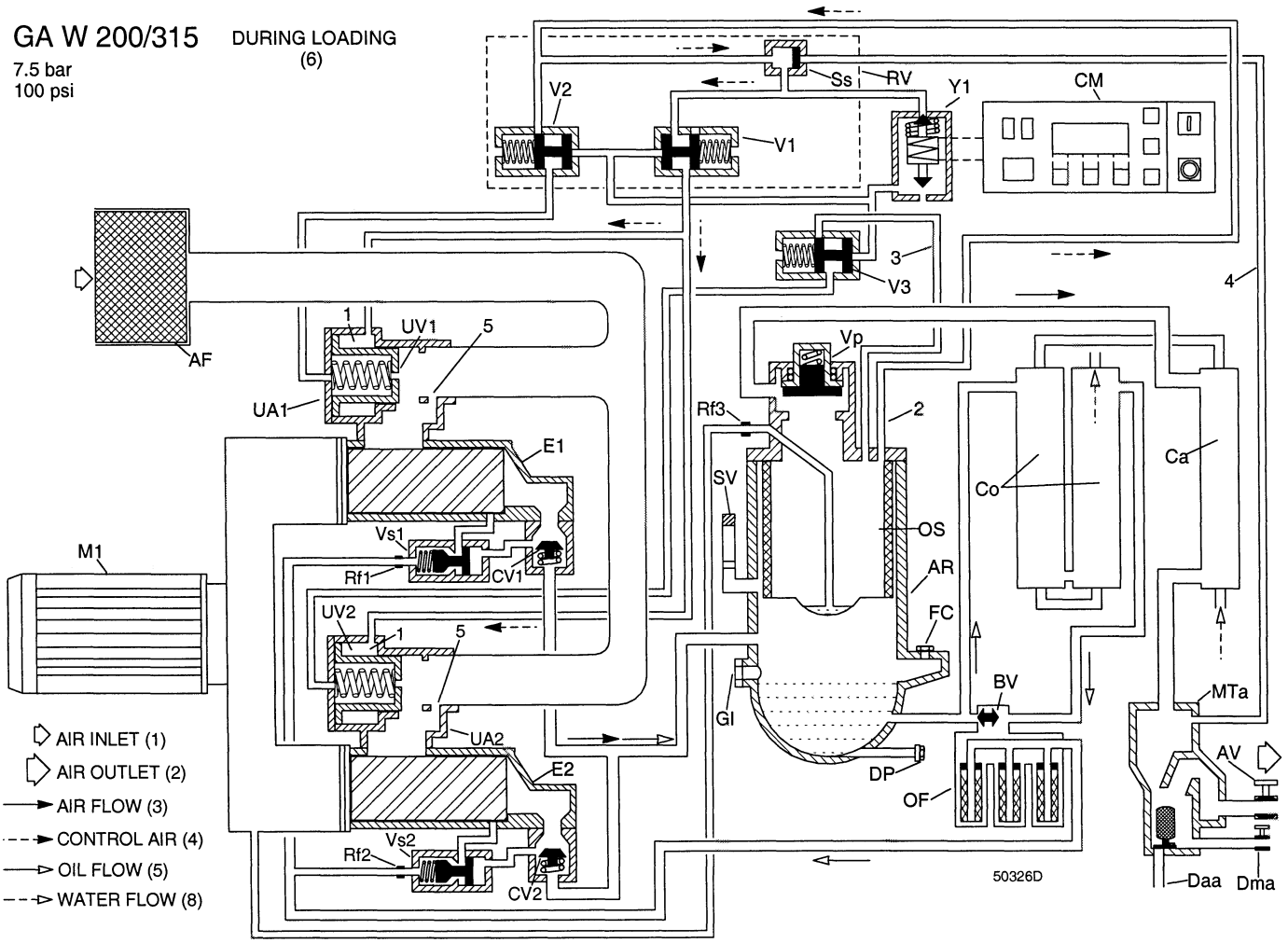


Fig. 5d GA W 200 up to -315 during loading (7.5 bar/100 psi)

outlet of compressor element (E) decreases, valve (V3) closes by spring force and stops blowing off air.

7. Valve (V2) allows the small flow of air, which remains drawn in through by-pass hole (5), to blow off from receiver (AR) via flexible (2) to unloader (UA).
8. Air delivery is stopped (0 %), the compressor runs unloaded.

GA/GA W 200 up to -315

1. Control pressure is fed via flexible (2) and selector valve (Ss) through solenoid valve (Y1) to valves (V1, V2 and V3).
2. The plungers of valves (V1, V2 and V3) move against spring force.
3. Control pressure present in chambers (1) of unloaders (UA1 and UA2) is vented to atmosphere through valve (V1). Unloading valves (UV1 and UV2) close by spring force.
4. **For 7.5 bar/100 psi compressors**, receiver pressure is released:
   - through flexible (2) and valve (V2) to unloader (UA1)
   - through flexible (3) and valve (V3) to unloader (UA2)
5. **For 10/13 bar/125/150/200 psi compressors**, receiver pressure is released:
   - through flexible (2) and valve (V2) to unloaders (UA1 and UA2)
   - through flexible (3) and valve (V3) to unloaders (UA1 and UA2)
6. As the receiver pressure decreases, selector valve (Ss) switches over.
7. Valves (V2 and V3) allow the small flow of air, which remains drawn in through by-pass holes (5), to blow off from receiver (AR) via flexibles (2 and 3) to unloaders (UA1 and UA2).
8. Air delivery is stopped (0 %), the compressor runs unloaded.

1.3.5.2 Loading

When the net pressure decreases to the lower limit of the working pressure (loading pressure), solenoid valve (Y1) is energized. The plunger of solenoid valve (Y1) moves upwards against spring force:

GA/GA W 90 up to -160

1. The plungers of valves (V1 and V2) return to their original positions by spring force as the control pressure is vented via solenoid valve (Y1).
2. Control pressure is fed via flexible (2) or flexible (4), selector valve (Ss) and valve (V1) to chamber (1) of unloader (UA) to open unloading valve (UV).
3. Valve (V2) stops blowing off the air which is drawn in.
4. Air delivery is resumed (100 %), the compressor runs loaded.

GA/GA W 200 up to -315

1. The plungers of valves (V1,V2 and V3) return to their original positions by spring force as the control pressure is vented via solenoid valve (Y1).
2. Control pressure is fed via flexible (2) or flexible (4), selector valve (Ss) and valve (V1) to chambers (1) of unloaders (UA1 and UA2) to open unloading valves (UV1 and UV2).
3. Valves (V2 and V3) stop blowing off the air which is drawn in.
4. Air delivery is resumed (100 %), the compressor runs loaded.

2 INSTALLATION

2.1 Dimension drawings (Figs. 6)

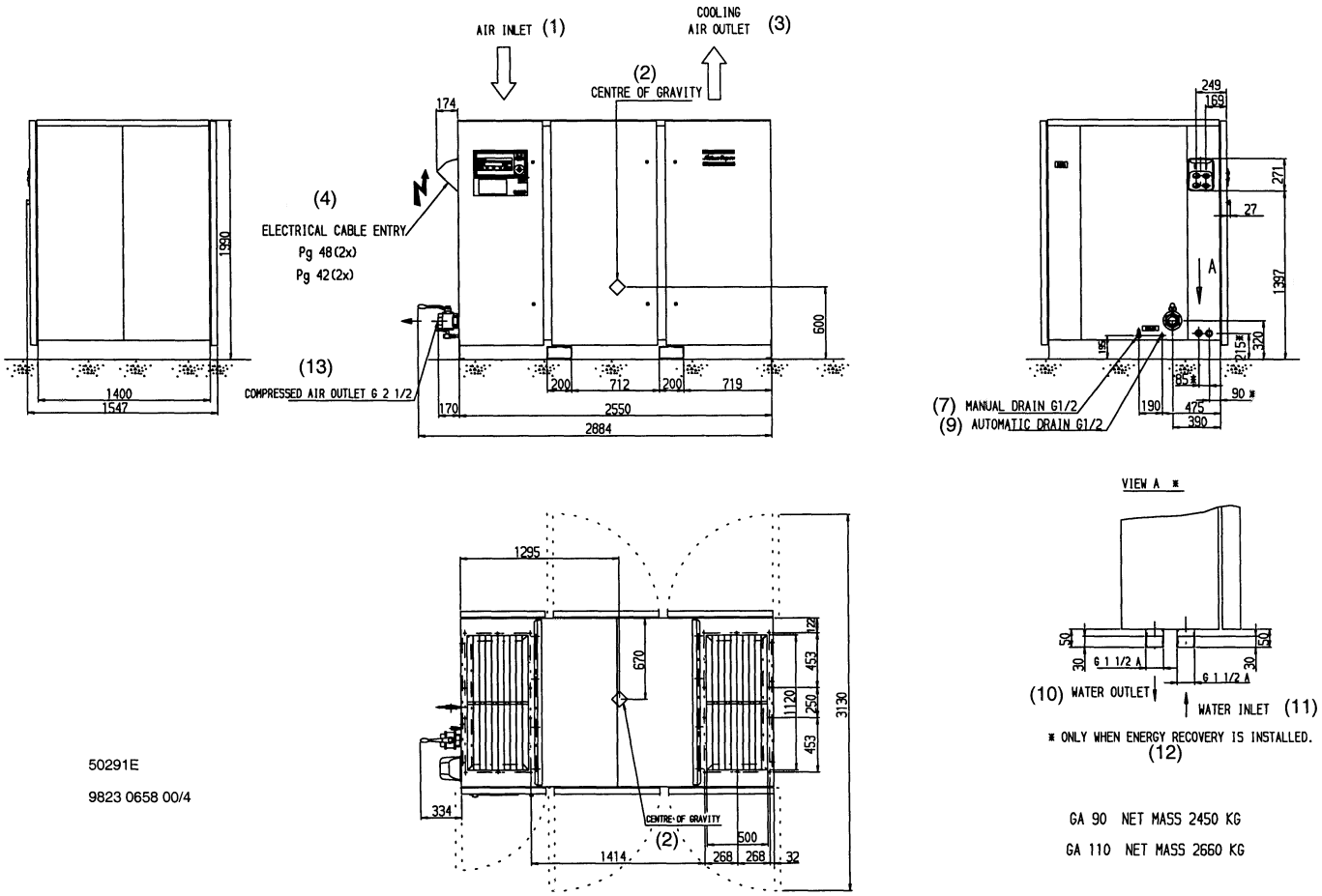


Fig. 6a. Dimension drawing GA90 and -110

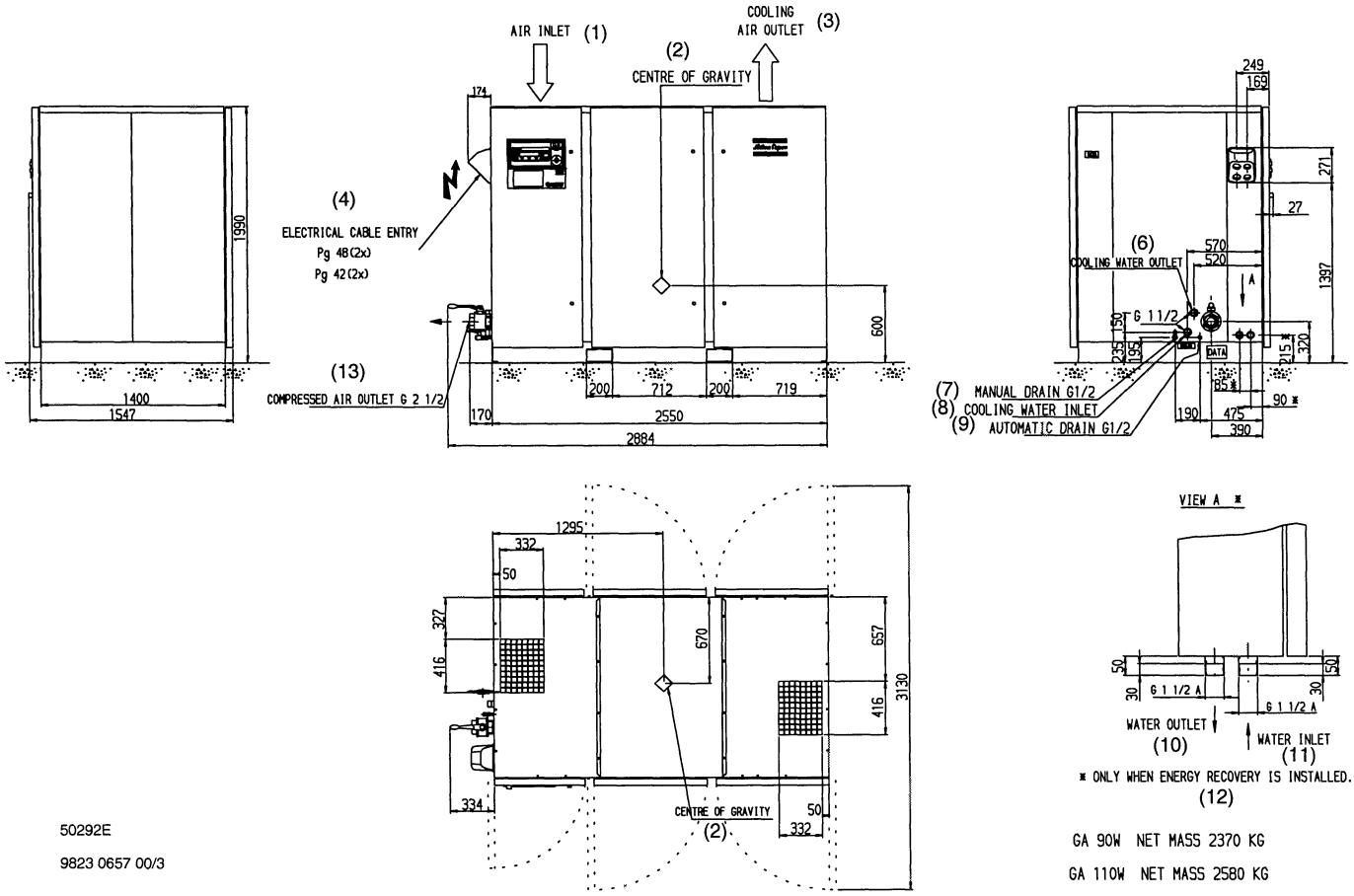


Fig. 6b. Dimension drawing GA W 90 and -110

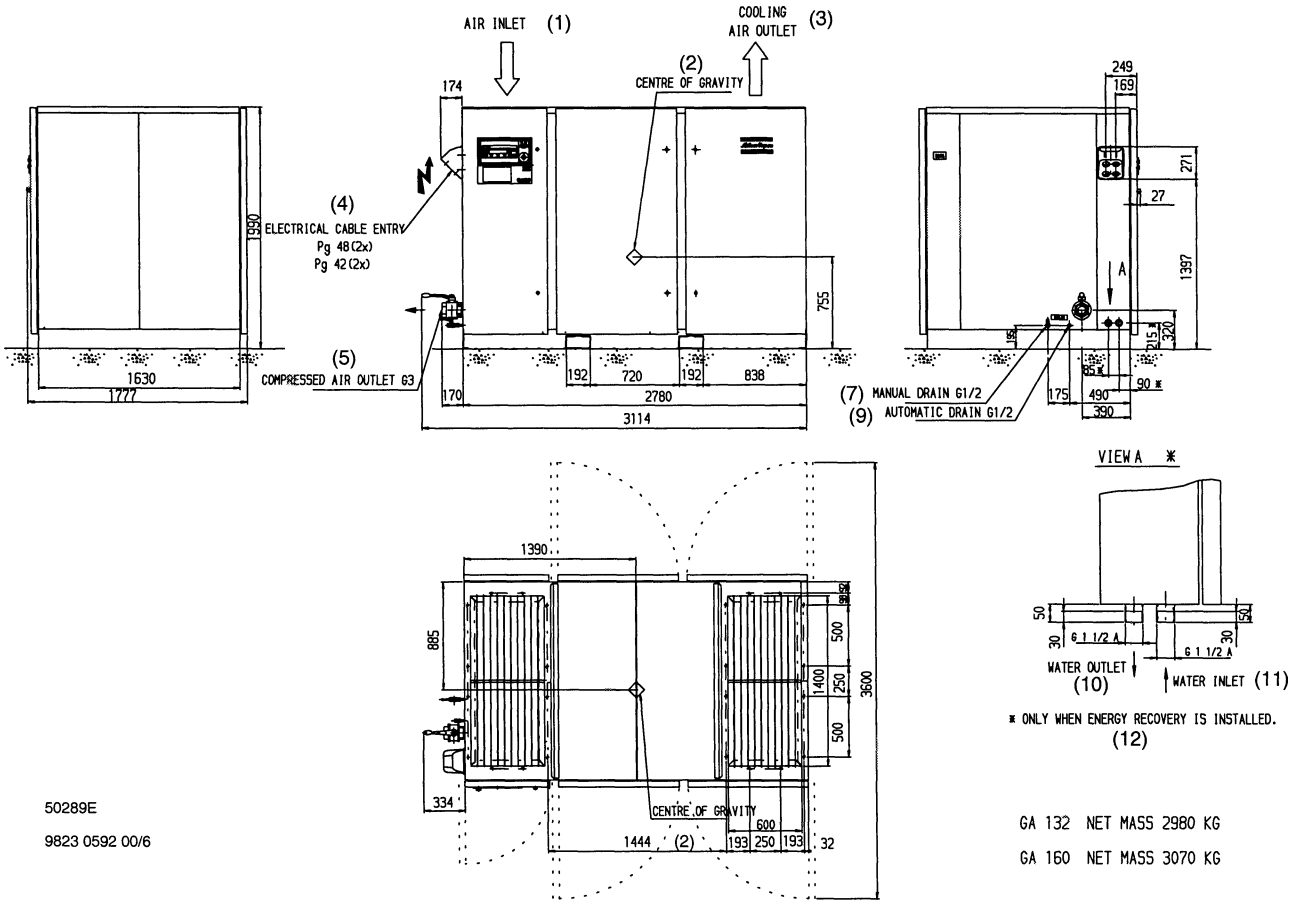


Fig. 6c. Dimension drawing GA132 and -160

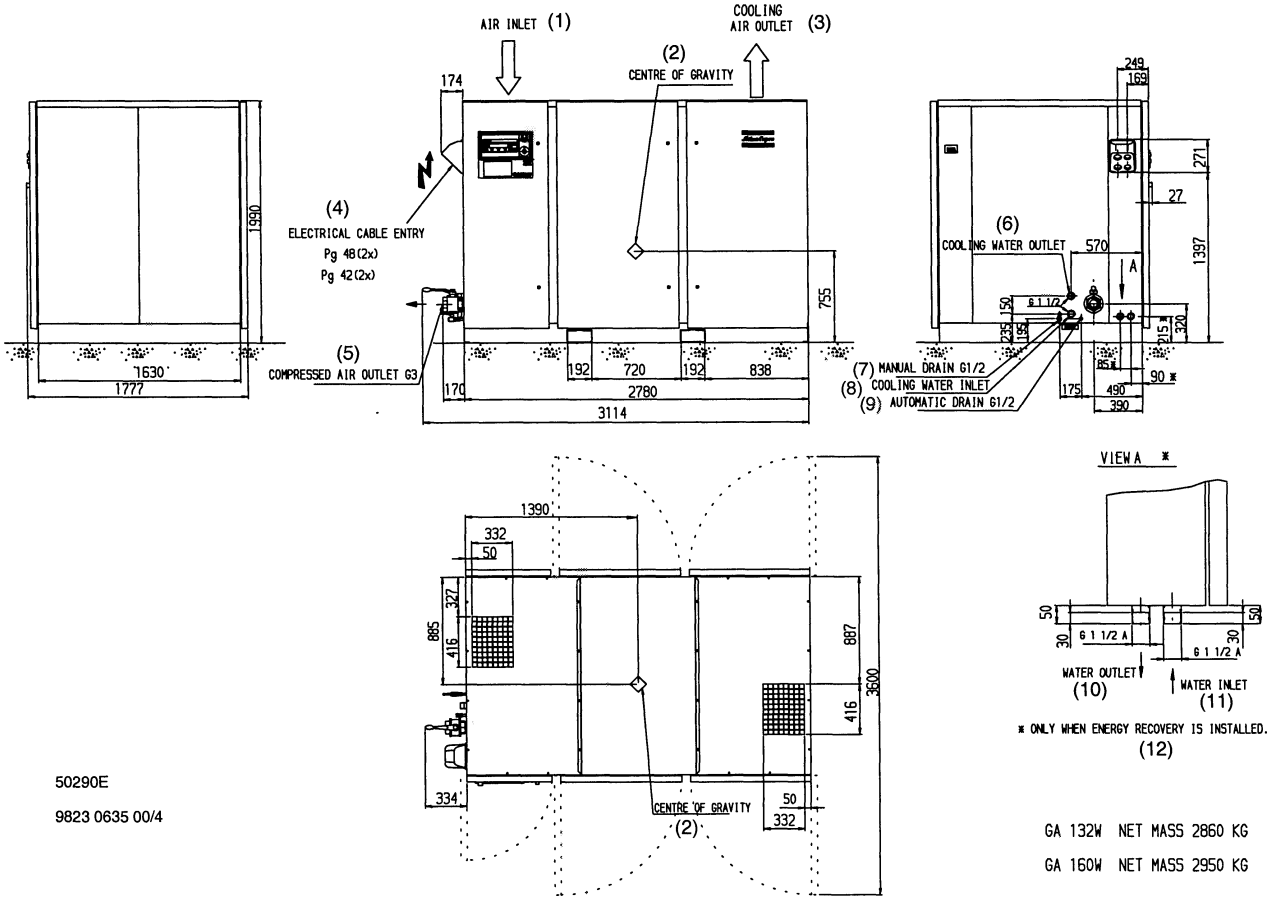


Fig. 6d. Dimension drawing GA W 132 and -160

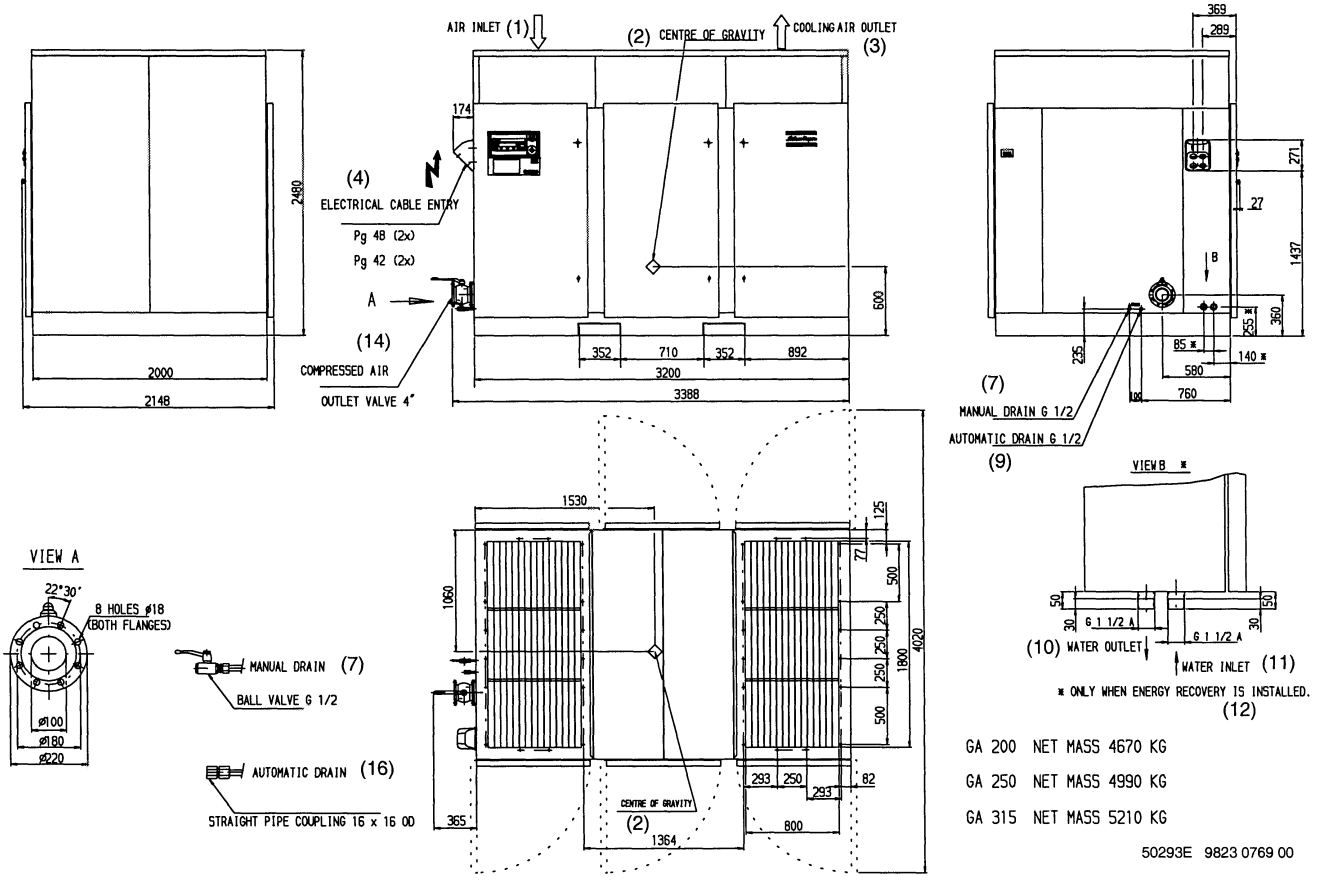


Fig. 6e. Dimension drawing GA200 up to -315

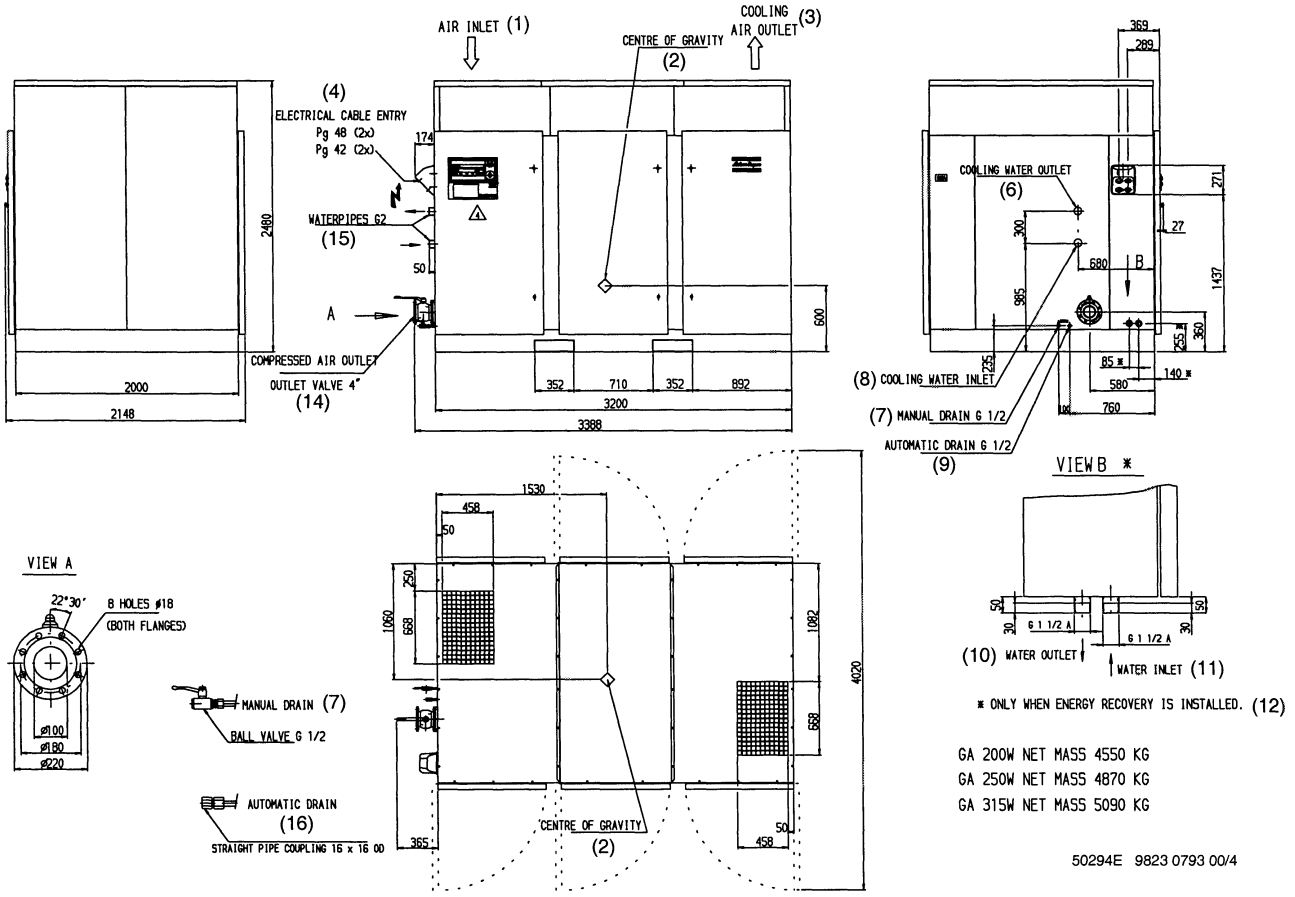


Fig. 6f. Dimension drawing GA W 200 up to -315

2.2 Installation proposal (Fig. 7)

1. Install the compressor on a level floor suitable for taking the weight of the compressor. For proposal 1, the recommended minimum distance between the top of the bodywork and the ceiling is 1200 mm.

2. Remove the plastic plug (if provided) from the compressor air outlet pipe and fit the air outlet valve to compressor outlet pipe (3-Fig. 8). Close the valve and connect it to the net.

3. The pressure drop over the air outlet pipe can be calculated as follows:

$$dp = \frac{L \times 450 \times Qc^{1.85}}{d^5 \times P}$$

dp = pressure drop (recommended maximum = 0.1 bar)
L = length of outlet pipe in m
d = inner diameter of the outlet pipe in mm
P = absolute pressure at the compressor outlet in bar(a)
Qc = free air delivery of the compressor in l/s

It is recommended that the connection of the compressor air outlet pipe is made on top of the main air net pipe to minimize carry-over of possible remainder of condensate.

As a rule of thumb, following formula can be used to calculate the recommended volume of the air net:

$$V = \frac{30 \times C \times p \times Q}{dP}$$

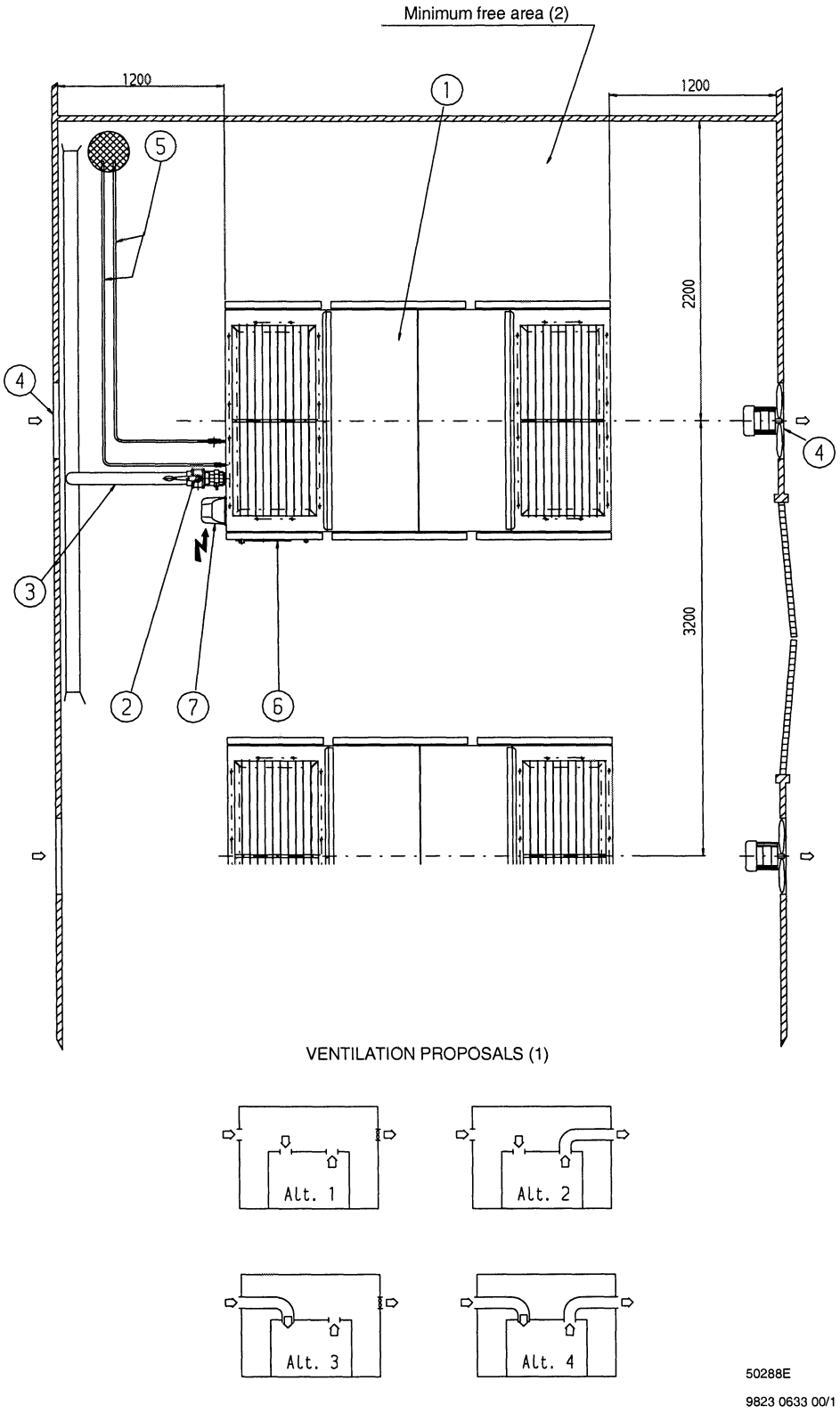


Fig. 7. Installation proposal

V = recommended air net volume in l
dP = pressure difference between unloading and loading pressures in bar (recommended minimum = 0.6)
p = compressor inlet pressure in bar absolute
Q = free air delivery of compressor in l/s
C = correction factor, see below

Air consumption divided by compressor air delivery	C
0.9	0.10
0.8	0.15
0.7	0.20
0.5	0.25
0.3	0.20
0.2	0.15
0.1	0.10

Example: air consumption = 360 l/s
compressor air delivery = 450 l/s
inlet pressure = 1 bar absolute
unloading pressure = 7.5 bar(e)
loading pressure = 6.8 bar(e)

Recommended air net volume (sum of receiver volume and volume of pipe net) = 2900 l. Consult Atlas Copco if in any doubt.

4. The inlet grids and ventilation fan should be installed in such a way that any recirculation of cooling air to the compressor or dryer (optional) is avoided. The air velocity to the grids is limited to 5 m/s.

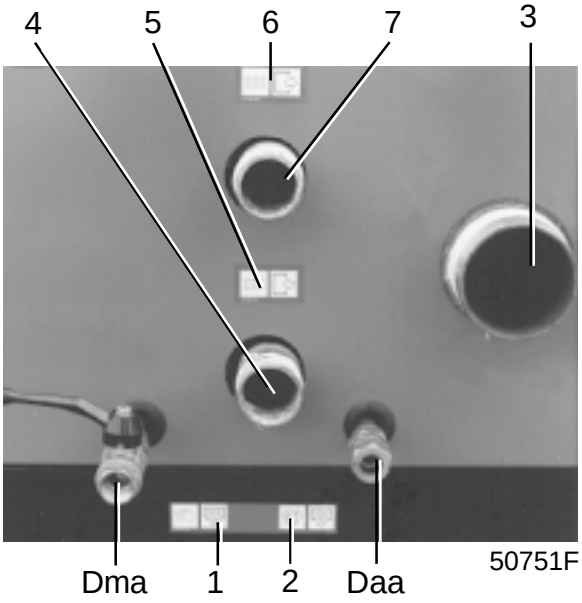
The required ventilation to limit the compressor room temperature can be calculated as follows:

For proposals 1 and 3: Qv = 0.92 N/dT

Qv = required ventilation capacity in m^3/s
N = shaft input of compressor in kW
dT = temperature increase in compressor room

If cooling air ducts are installed, the maximum allowable pressure drop over the ducts is 30 Pa. The maximum pressure drop depends on the ambient temperature. The fan capacity should match the compressor fan capacity at a pressure head equal to the pressure drop caused by the cooling air outlet ducts. Consult Atlas Copco.

5. Fit manual condensate drain valve (Dma-Fig. 8). Lay out the drain piping from valve (Dma) and from automatic drain outlet (Daa) towards the condensate collector. The drain pipes must not dip into the water of the drain collector. For draining of pure condensate water, install an oil/water separator. See section 1.1. It is recommended to provide a funnel to allow visual inspection of the condensate flow.



Daa. Automatic condensate drain outlet
Dma. Manual condensate drain valve
1. Pictograph, manual condensate drain
2. Pictograph, automatic condensate drain
3. Location of air outlet valve
4. Cooling water inlet **1)**
5. Pictograph, cooling water inlet **1)**
6. Pictograph, cooling water outlet **1)**
7. Cooling water outlet **1)**

Fig. 8. Air outlet and condensate drain outlets

1) GA W only

For GA W, fit a valve in the compressor water inlet pipe and outlet pipe. Also provide water drain valves. Remove the plastic plugs (if provided) from compressor water pipes (4 and 7-Fig. 8) and connect the pipes to the cooling water circuit.

6. Position of Elektronikon control panel.

7. See section 2.3 for the recommended size of the supply cables. Check that the electrical connections correspond to the local codes. The installation must be earthed and protected against short circuits by fuses in all phases. An isolating switch must be installed near the compressor.

2.3 Electric cables

Remarks

- The size is valid for cable PVC 70°C at ambient 40°C according to EN60204, except for 60 Hz compressors for Canada and USA: cable PVC 90°C at ambient 40°C according to CE code Part I Tables 2, 5A, 17 and rules 28-106, 28-108, 28-110.
- Local regulations remain applicable if they are stricter than the values proposed below.
- The voltage drop must not exceed 5% of the nominal voltage. It may be necessary to use cables with a larger section than those stated to comply with this requirement.
- The connections are shown on Figs. 9

2.3.1 GA - 50 Hz

Compressor type	Mains + earth cable in mm²		
	220/240 V	380/415 V	500 V
90	3x240 + 120	3x95 + 50	3x70 + 35
110	2x (3x120 + 70)	3x150 + 95	3x95 + 50
132	2x (3x150 + 95)	3x185 + 95	3x120 + 70
160	2x (3x240 + 120)	3x240 + 120	3x180 + 95
200	--	2x (3x120 + 70)	3x240 + 120
250	--	2x (3x150 + 95)	2x (3x95 + 50)

2.3.2 GA W - 50 Hz

Compressor type	Mains + earth cable in mm²		
	220/240 V	380/415 V	500 V
90	3x240 + 120	3x95 + 50	3x70 + 35
110	2x (3x95 + 50)	3x150 + 95	3x95 + 50
132	2x (3x150 + 95)	3x185 + 95	3x120 + 70
160	2x (3x185 + 95)	3x240 + 120	3x150 + 95
200	--	2x (3x120 + 70)	3x240 + 120
250	--	2x (3x150 + 95)	2x (3x95 + 50)

2.3.3 GA/GA W - 60 Hz (except for Canada/USA)

Compressor type	Mains + earth cable in mm²		
	220/230 V	380 V	440/460 V
90	2x (3x120 + 70)	3x120 + 70	3x120 + 70
110	2x (3x150 + 95)	3x185 + 95	3x150 + 95
160	--	2x (3x95 + 50)	3x240 + 120
200	--	2x (3x120 + 70)	2x (3x95 + 50)
250	--	2x (3x150 + 95)	2x (3x120 + 70)
315	--	2x (3x185 + 95)	2x (3x150 + 95)

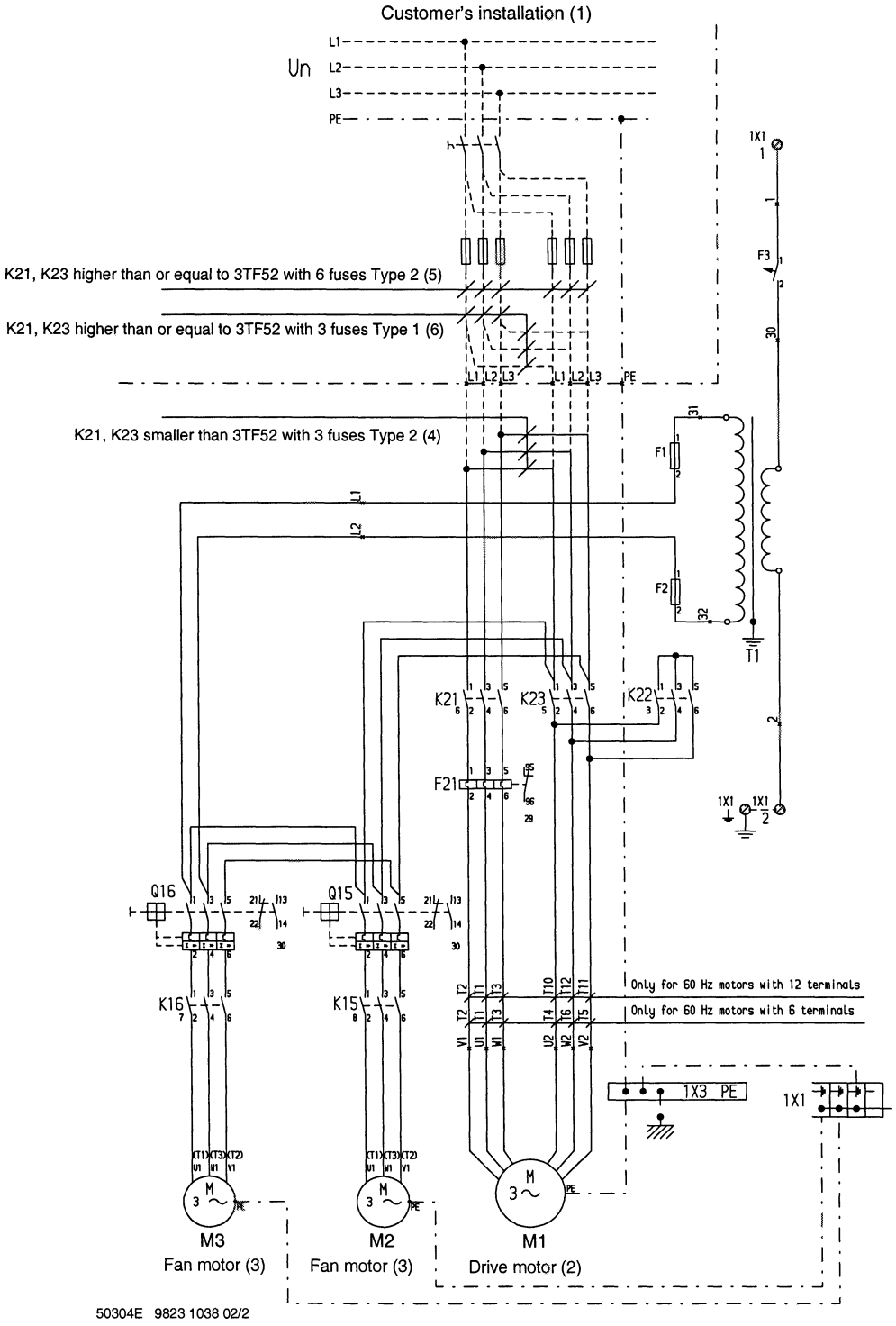


Fig. 9a IEC/VDE

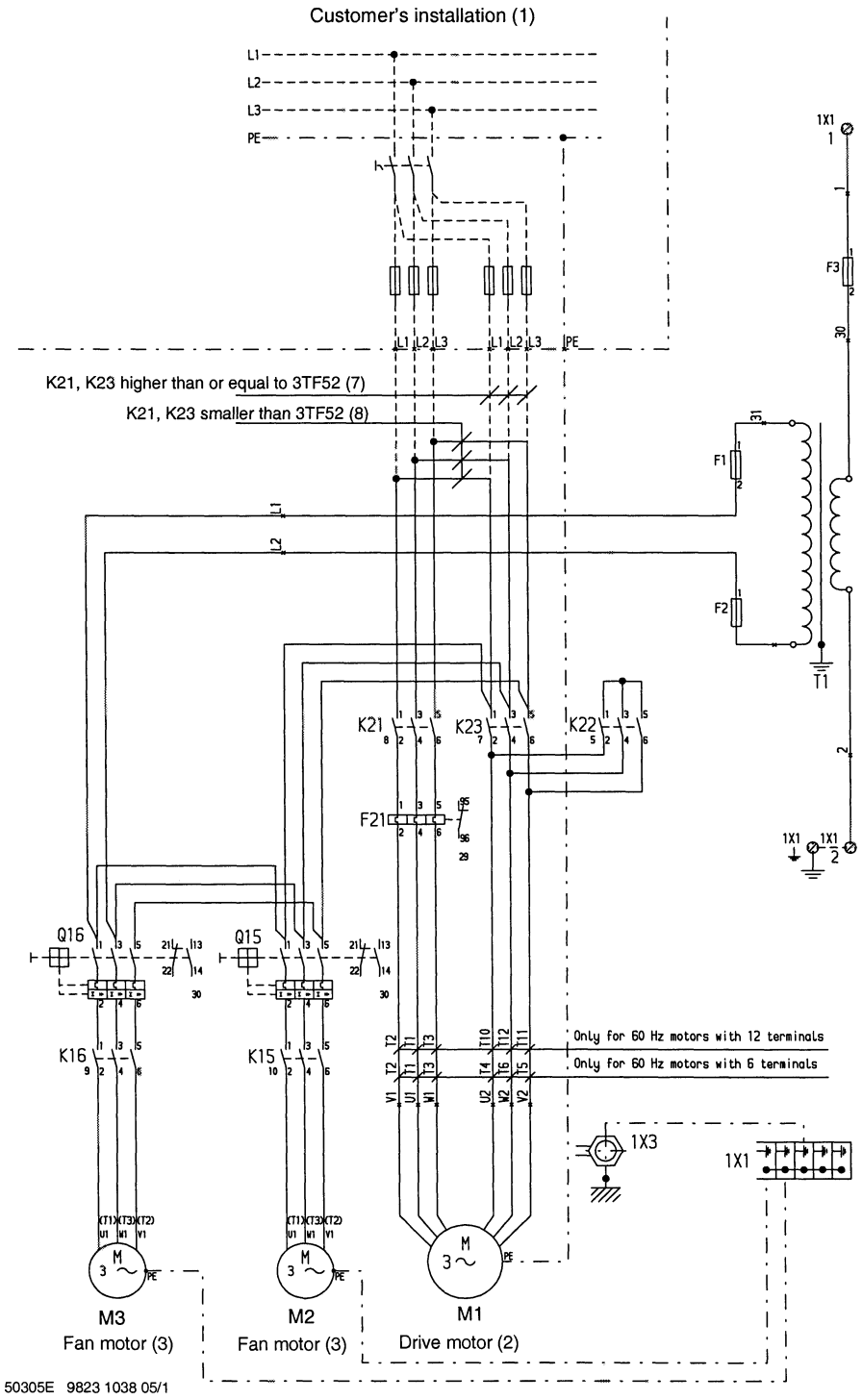


Fig. 9b 60 Hz CSA/UL

Figs. 9. Electrical connections (typical examples)

2.3.4 GA/GA W - 60 Hz compressors for Canada/USA

Compressor type	Mains + earth cable in mm²	
	440/460 V	575 V
90	3xMCM250 + AWG0	3xAWG00 + AWG4
110	3xMCM300 + AWG0	3xAWG4/0 + AWG2
160	2x (3xAWG00 + AWG4)	3xMCM300 + AWG0
200	2x (3xAWG4/0 + AWG2)	2x (3xAWG00 + AWG4)
250	2x (3xMCM250 + AWG0)	2x (3xAWG3/0 + AWG2)
315	2x (3xMCM350 + AWG0)	2x (3xAWG4/0 + AWG2)

2.4 Pictographs

Following pictographs are provided on control panel (Fig. 10a):

1 Automatic operation
2 Voltage on
3 Start
4 Stop
5 Compressor locked (in off position)
6 Local control
7 Remote control (by external switches)
8 Remote control (by computer)
9 Emergency stop
10 Keys to scroll through display
11 Key to go to next field on display
12 Alarm

Following pictographs are provided below control panel (Fig. 10a) **1)**:

13 Check valve
14 Oil separator
15 Coolers
16 Condensate trap
17 Outlet
18 Oil filter
19 Air filter
20 Valve
21 By-pass valve
22 Compressor element(s)

1) On earlier production units only

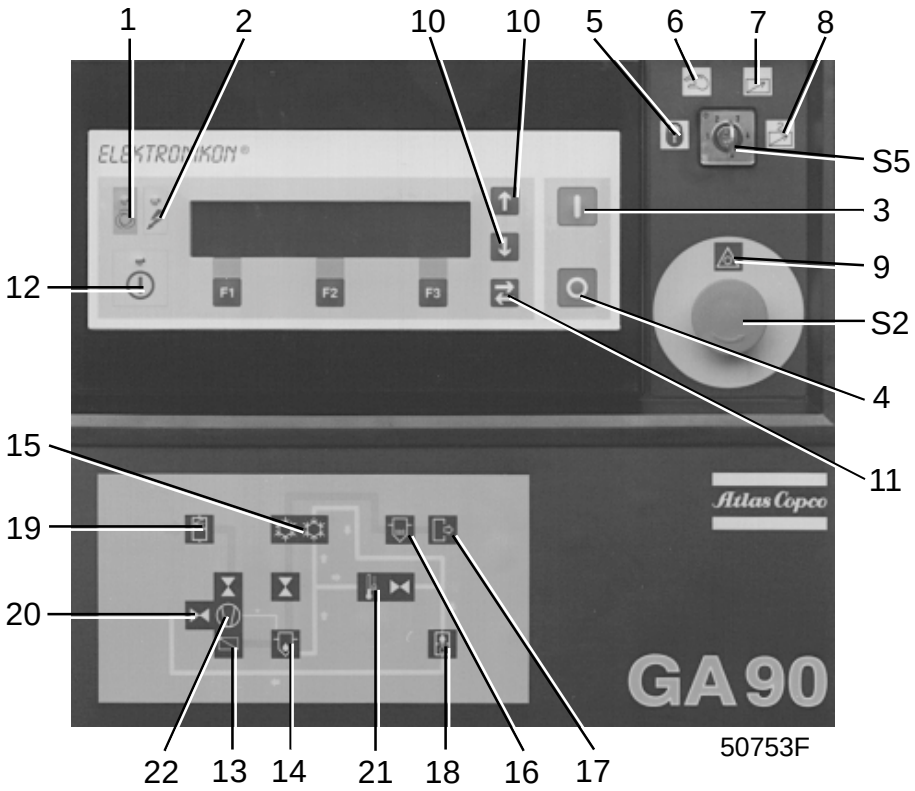


Fig. 10a. Pictographs on control panel

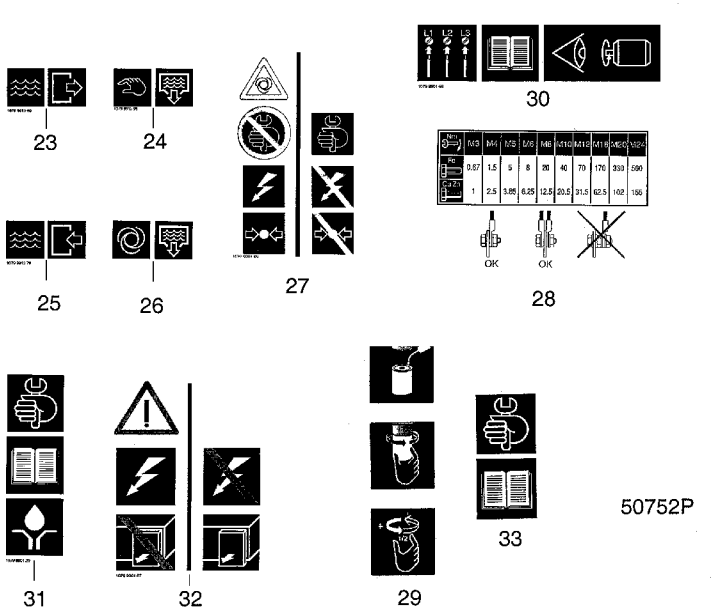


Fig. 10b. Pictographs on/inside bodywork

Figure 10b shows pictographs which may be stuck on or inside the bodywork:

23 Water outlet
24 Manual condensate drain
25 Water inlet
26 Automatic condensate drain
27 Switch off voltage and depressurize compressor before maintenance or repair
28 Torques for iron (Fe) or brass (CuZn) bolts
29 Oil gasket, screw on filter and then tighten by hand (approx. one half turn)
30 Before connecting compressor electrically, consult Instruction book for motor rotation direction
31 Consult Instruction book before greasing
32 Switch off voltage before removing protecting cover inside electric cubicle
33 Consult Instruction book before maintenance or repair

2.5 Cooling water requirements

For GA W, following requirements are given as a general rule to prevent cooling water problems. If in any doubt, consult Atlas Copco.

Recommended maxima - mg/l	**Recirculating system**	**Open system**
Chloride (Cl^-)	< 600	< 150
Sulphate (SO_4^{--})	< 400	< 250
Total solids	< 3000	< 750
Suspended solids (as SiO_2)	< 10	< 10
Free chlorine (Cl_2)	< 4	< 2
Ammonia (NH_4^+)	< 0.5	< 0.5
Copper	< 0.5	< 0.5
Iron	< 0.2	< 0.2
Manganese	< 0.1	< 0.1
Oxygen	< 3	< 3
Carbonate hardness (as $CaCO_3$)	50-1000	50-500
Organics ($KMnO_4$ Consumption)	< 25	< 10

Remarks

- No algae nor oil.
- Chloride and sulphate are interactive. In open systems the sum of the squares of these values must not exceed 85,000. For recirculating systems with proper controls and treatment, the sum of the squares may be up to 520,000. Note that the sulphate value must include any sulphite present.

3 OPERATING INSTRUCTIONS

Safety precautions
The operator must apply all related safety precautions including those mentioned in this book.

Outdoor/altitude operation
If the compressor is installed outdoors or if the air inlet temperature can be below 0°C (32°F), precautions must be taken. In this case, and also if operating at high altitude, consult Atlas Copco.

Moving/lifting
The compressor can be moved by a lift truck using the slots in the frame. Make sure that the forks protrude from the other side of the frame. The compressor can also be lifted after inserting beams in the slots. Make sure that the beams cannot slide and that they protrude from the frame equally. The chains must be held parallel to the bodywork by chain spreaders in order not to damage the compressor. The lifting equipment must be placed in such a way that the compressor will be lifted perpendicularly. Lift smoothly and avoid twisting.

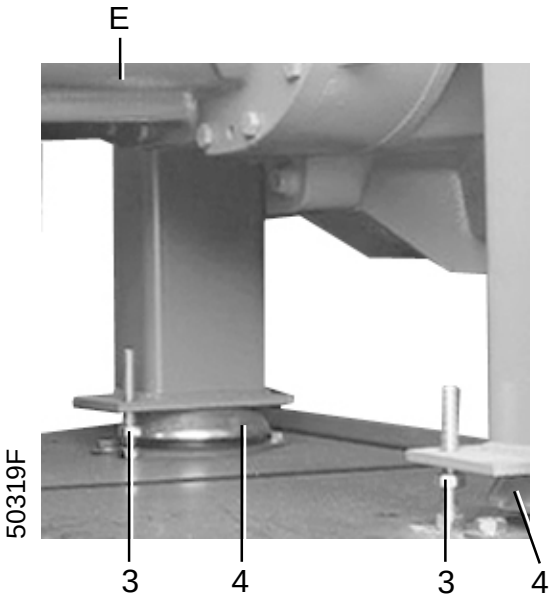


Fig. 11a Gear casing side

3.1 Preparation for initial start-up

1. Consult section 2 for the electric cable size, installation proposal and dimension drawings.
2. Read the "User manual for Elektronikon® regulator" to familiarize yourself with all regulator functions.
3. A sticker dealing in short with the operation instructions is delivered with the literature set. Affix the sticker next to the control panel.
4. Stick labels near the control panel warning the operator that:
   - the compressor may automatically restart after voltage failure
   - the compressor is automatically started and stopped
   - the compressor may be remotely controlled

   See section 1.2.
5. The gear casing supports and motor support are secured to the frame, immobilizing the vibration dampers during transport. Remove stud and nuts (3-Fig. 11a) of both gear casing supports as well as bushes (1-Fig. 11b) of the motor support.
6. Check the wires at transformer (T1-Fig. 2) for correct connection, the settings of overload relay (F21) and circuit breakers (Q15/16) **1)**, and that overload relay (F21) is set for automatic resetting (indicated on the relay by "A"). See section 7.4.

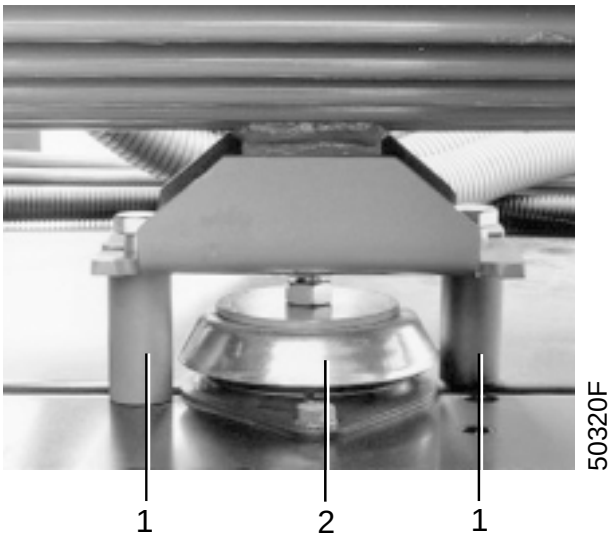


Fig. 11b Motor side

E. Compressor element
M1. Drive motor
1. Bush, **to be removed**
2. Vibration damper
3. Stud and nut, **to be removed**
4. Vibration damper

Figs. 11. Transport fixations

1) GA90 and -110 have one fan motor and circuit breaker, GA132 up to -315 have two fan motors and circuit breakers.

7. Remove filler plugs (FC2-Fig. 1b). Pour approx. 1 l (0.25 US gal) of oil into the compressor elements (use the bottle with Roto-injectfluid which is delivered with the compressor). Reinstall the plugs. **1)**
8. Close drain valve (Dma-Fig. 8).
9. **For GA W**, Check that the cooling water drain valves (customer's installation) in the inlet and outlet lines are closed. **Open the water inlet valve and outlet valve (customer's installation) and check for water flow.**
10. Check that the compressor is filled with oil: the pointer of oil level indicator (Gl-Fig. 1a) should be in the green range or orange range.
11. Switch on the voltage. Start the compressor and stop it immediately. Check the rotation of drive motor (M1-Fig. 14a), and **on GA** also of fan motors (M2/3-Fig. 14a). **2)** When facing the drive end shaft of the motors, the correct rotation direction is counter-clockwise for both the drive motor and the fan motors.
    - First check the drive motor. If the rotation direction is wrong, switch off the voltage and reverse two incoming electric lines.
    - Check fan motor (M2). If necessary, switch off the voltage and reverse two incoming connections at the terminals of circuit breaker (Q15-Fig. 2).
    - Check fan motor (M3). **2)** If necessary, switch off the voltage and reverse two incoming connections at the terminals of circuit breaker (Q16-Fig. 2).

3.2 Before starting

Attention
- The operator must apply all relevant safety precautions, including those mentioned in this instruction book.
- In case the water system was drained (see section 3.7), close the drain valves and fit the drain plugs.

1. Switch on the voltage. Voltage on LED (2-Fig. 3a) lights up.
2. Close condensate drain valve (Dma-Fig. 8).
3. Open air outlet valve (3-Fig. 8).
4. Check oil level indicator (Gl-Fig. 1a): the pointer should be in the green range or orange range. **3)**

On GA W also:

5. Open the water inlet valve and outlet valve (customer's installation).
   Opening of the water outlet valve can be overlooked if, after previous operation, the setting of this valve has not been disturbed.

3.3 Routine starting (Fig. 3a)

1. Press start button (8). The compressor starts running in unloaded condition. Automatic operation LED (1) lights up.

Important
- If the oil injection pressure at the compressor elements is too high during starting, the compressor will not start. See section 1.2.1.5.
- In automatic operation, the regulator limits the number of motor starts. Wait 20 minutes in case of manual restarting.

2. Approx. 10 seconds later (programmable), the compressor starts running loaded. The message on display (4) changes from <<Automatically unloaded>> to <<Automatically loaded>>.

On GA W also:

3. Regulate the cooling water flow **with the compressor running loaded**. Adjust the water flow to obtain the most suitable air temperature at the element outlet, i.e. between 2°C and 7°C above the relevant temperature in Fig. 12.

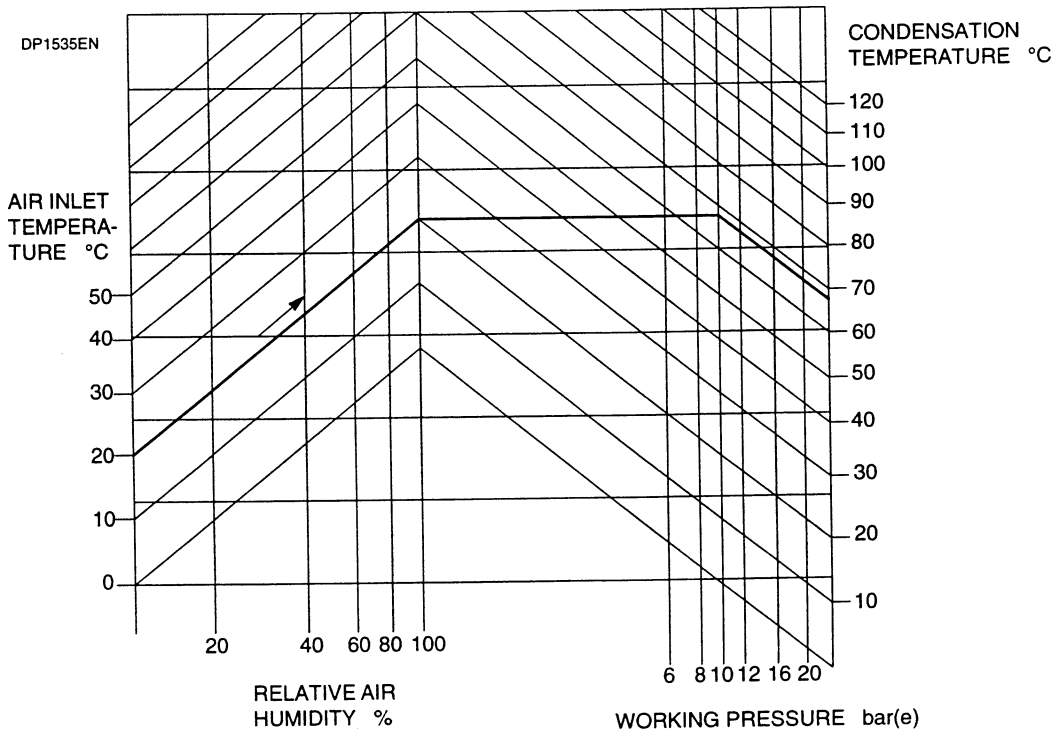
Attention
- For optimum operation, the cooling water outlet temperature must never exceed the value specified in section 7.5.2.
- Consult Atlas Copco if condensate should be formed during frequent unloading periods.

3.4 Starting after emergency stop or shut-down (Fig. 3a)

Press emergency stop button (S2) (if not yet done), switch off the voltage and then depressurize the compressor. After remedying the fault, the compressor can be restarted as described above.

If the function 'automatic restart after voltage failure' is activated (see section 1.2.1.4) and the duration of repair is shorter than the programmed power recovery time, reset the display after remedying the fault: press key <<Reset>>, the message <<All protection functions are OK>> will appear whereafter the compressor can be restarted. Press keys <<Menu>> and <<Main Screen>> to return to the main display (Fig. 3b).

1) GA/GA W 90 up to -160 are equipped with one compressor element and unloader, all other types have two compressor elements and unloaders.
2) GA90 and -110 have one fan motor and circuit breaker, GA132 up to -315 have two fan motors and circuit breakers.
3) If the compressor has only just stopped, wait one minute before checking the level.



Example:

Ambient temperature	20°C
Relative humidity	100 %
Working pressure	10 bar(e)

According to the table, the minimum allowable temperature at the outlet of the compressor elements is 68°C.
Regulate the cooling water flow during loading to obtain a temperature between 70°C and approx. 75°C at the outlet of the compressor elements

Fig. 12. Minimum allowable air temperature at outlet of compressor elements (**for GA W**)

3.5 During operation (Fig. 3a)

1. When automatic operation LED (1) is alight, starting and stopping of the motor is controlled automatically.
2. Check the readings on display (4). See below.
3. On reaching the pre-set unloading pressure, shown on display (4), the compressor will run unloaded. The operation of the compressor is automatically controlled by the regulator depending on the air consumption.
4. To unload the compressor manually, press key <<Unload>> (5) **1)**. To put the compressor back into automatic operation, press key <<Load>> (5) **1)**.

Important

- If the compressor is stopped, it may start automatically. See also section 1.2.1.
- The regulator will only react to a new control mode if the new position of key (S5) is maintained for 3 seconds.
- To avoid unauthorized switching over to another control mode, take out key (S5) after selecting the required mode. See also section 1.2.3.

3.5.1 Checking the display (4-Fig. 3a)

1. Regularly check the display for readings and messages. Normally, the main display (Fig. 3b) is shown, indicating the compressor outlet pressure, the status of the compressor and the functions of the keys below the display.
2. Always check the display and remedy the trouble if alarm LED (3) is alight or blinks. See section 1.2. Also consult the "User manual for Elektronikon regulator", section "Submenu STATUS DATA".
3. The display will show a service message if one of the monitored components is to be serviced; replace the component, change the oil or grease the drive motor as the case may be. Reset the relevant timer. Consult the "User manual for Elektronikon® regulator", "Submenu SERVICE".

1) If the <<Load>> or <<Unload>> function is not indicated on the bottom line of display (4), press key <<Menu>> (5) until function <<Main Screen>> appears above key (F1), then press key <<Main Screen>>.

Warning
Before carrying out any maintenance, repair or adjustment, stop the compressor, press emergency stop button (S2-Fig. 3a), switch off the voltage and depressurize the compressor.

Notes
- Whenever a warning, service request, sensor error or motor overload message is displayed, the free spaces on the display between function keys (5-Fig. 3a) are filled with blinking indicators (***).
- When more than one message needs to be displayed (e.g. both warning and service), the messages will be displayed one after the other for 3 seconds.

4. Regularly press key <<Show More>> (5-Fig. 3a) **2)** to call up information about the actual compressor condition:
   - the status of controlling the compressor (automatic or manual, local or remote)
   - the status of the compressor start/stop timer (active or not active) **1)**
   - the maximum allowable unloading pressure
   - the compressor outlet pressure
   - the pressure drop over the air filters
   - the pressure difference over the oil separator
   - the oil injection pressure at compressor element 1 **3)**
   - the compressor outlet temperature
   - the outlet temperature at compressor element 1 **3)**
   - the cooling air inlet temperature (**on GA**) or cooling water outlet temperature (**on GA W**)
   - the status of the overload protection of both the drive motor and fan motor (normal or not)
   - the total running and loading hours

3.6 Manual unloading/loading (Fig. 3a) 4)

Normally, the compressor runs in automatic operation, i.e. the electronic regulator loads, unloads, stops and restarts the compressor automatically. LED (1) is then alight.

If required, the compressor can be unloaded manually. In this case, the compressor is switched out of automatic operation: the compressor remains running unloaded unless it is loaded again manually.

Manually unloading
Press key <<Unload>> (5). LED (1) goes out. The message <<Manually Unloaded>> appears on the display.

Manually loading
Press key <<Load>> (5). LED (1) lights up. The command <<Load>> does not force the compressor in loaded condition, but it will switch the compressor to automatic operation again: the compressor will be loaded if the air net pressure drops below the programmed level.

3.7 Stopping (Fig. 3a)

1. Press stop button (9). LED (1) goes out. The message <<Programmed stop>> appears. The compressor runs unloaded for 30 seconds and then stops.
2. **To stop the compressor in case of emergency**, press button (S2). Alarm LED (3) blinks. After remedying the fault, unlock the button by turning it anticlockwise.
3. Close air outlet valve (3-Fig. 8).
4. Open condensate drain valve (Dma-Fig. 8).
5. **On GA W**, close the water inlet valve.
6. **On GA W, if the compressor is installed in a room where freezing temperatures are expected**, drain the cooling system completely:
   - by opening the drain valves in the water inlet and outlet pipes (customer's installation)
   - by removing drain plugs (DP6-Fig. 14b)
7. Switch off the voltage.

Important
- After pressing stop button (9), the compressor will run unloaded for 30 seconds. The compressor stops after this period. A start command during this time is ignored.
- After stopping, the compressor is prevented from restarting within a programmable time (20 seconds). A start command given during this minimum stop time will be memorized; automatic operation LED (1) lights up. The compressor will start when the minimum stop time has run out.

3.8 Taking out of operation

At the end of the service life of the compressor, proceed as follows:

1. Stop the compressor and close the air outlet valve.
2. Switch off the voltage and disconnect the compressor from the mains.
3. Depressurize the compressor by opening valve (Dma-Fig. 8) and loosening plug (FC1-Fig. 1a) one turn.
4. Shut off and depressurize the part of the air net which is connected to the outlet valve. Disconnect the compressor air outlet pipe from the air net.
5. Drain the water, oil and condensate circuits.
6. Disconnect the compressor condensate piping from the condensate drain net.
7. Disconnect the cooling water pipes from the compressor.

---

1) The compressor is automatically started and stopped if these start/stop commands are programmed and activated; consult section 1.2.1.1.

2) If function <<Show More>> is not indicated on the bottom line of display (4-Fig. 3a), press key <<Menu>> (5) until function <<Main Screen>> appears above key (F1), then press key <<Main Screen>>.

3) GA/GA W 90 up to -160 have one compressor element; GA/GA W 200 up to -315 have two elements (element 1 stands for the element at the outer side).

4) If the <<Load>> or <<Unload>> function is not indicated on the bottom line of display (4), press key <<Menu>> (5) until function <<Main Screen>> appears above key (F1), then press key <<Main Screen>>.

4 MAINTENANCE

Warning
Before carrying out any maintenance or repair, press stop button (9-Fig. 3a), wait until the compressor has stopped (approx. 30 seconds) and then press emergency stop button (S2). Switch off the voltage and depressurize the compressor.

Take precautions to avoid an accidental restart. Apply all relevant safety precautions, including those mentioned in this book.

4.1 Preventive maintenance schedule for the compressor 1)

The schedule contains a summary of the maintenance instructions. Read the related section before taking maintenance measures.

In servicing, replace all removed gaskets, O-rings and washers.

The "longer interval" checks must also include the "shorter interval" checks.

Period 2)	Running hours 2)	Consult section	See note	Operation
Daily	--	3.5/7.1	--	Check readings on display
"	--	--	--	Check that condensate is discharged (Daa) during loading
3-monthly	--	5.3	--	Operate safety valve (SV)
"	--	--	--	Remove, dismantle and clean float valve of moisture trap (MTa)
"	--	--	--	Clean compressor
"	--	--	4	Check for possible leaks
"	**500**	5.2	--	Check coolers (Ca and Co); clean if necessary
"	**500**	5.1	1	Remove air filters (AF) and inspect
				For GA/GA W 13 bar and 200 psi
Yearly	**2000**	4.3/4.4/4.7	8	When Atlas Copco Roto-injectfluid is used, change oil
				For GA/GA W 7.5/10 bar and 100/125/150 psi
"	**4000**	4.3/4.4/4.7	8	When Atlas Copco Roto-injectfluid is used, change oil
"	**2000**	4.5/4.7	2	Replace oil filters
"	--	--	6	Carry out a LED/display test
"	--	--	5	Have all flexibles inspected
"	--	4.7/5.1	2	Replace air filters
"	--	5.3	7	Have safety valves tested
"	--	--	--	Have the compressor inspected by an Atlas Copco Service representative
"	--	--	--	Have operation of sensors, electrical interlockings and components tested by an electrician
"	--	--	--	Check restrictor (Rf2) and also restrictor upstream of oil stop valve (Vs) for cleanness
2-Yearly	**8000**	--	3	Have oil separator element replaced

1) **Use only authorized parts. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.**
2) **Whichever interval comes first.** The local Atlas Copco Sales Company may overrule the maintenance schedule, especially the service intervals, depending on the environmental and working conditions of the compressor.

Notes
1. In very dusty surroundings it may be necessary to check and replace the air filters more frequently. Consult Atlas Copco.
2. Use Atlas Copco filters.
3. The separator element must be replaced two-yearly or each 8000 running hours or when the pressure difference over the element exceeds 0.8 bar (12 psi). Check the pressure drop when the compressor is running loaded and preferably with a stable working pressure.
4. Any leak should be attended to immediately.
5. Damaged flexibles must be replaced immediately.
6. See "User manual for Elektronikon regulator", section "Submenu TEST".
7. Preferably to be carried out by an Atlas Copco Service representative.
8. If the outlet temperature of the compressor elements should be continuously higher than 100°C (212°F), consult Atlas Copco.

4.2 Motors

4.2.1 Fan motors (GA only)

GA132 up to -315 have two fan motors (M2 and M3-Fig. 14a). GA90 and -110 have one fan motor (M2). The bearings of the motors must be replaced after 25,000 operating hours.

4.2.2 Drive motor (M1-Fig. 1a)

Stop the compressor before greasing.

The bearings must be regreased every 4000 operating hours with a lithium-soap-based grease according to DIN 51 825 K3k. Quantity: 50 g (1.7 oz) per bearing. The lubrication points are marked.

4.3 Oil specifications

4.3.1 Roto-injectfluid

It is strongly recommended to use Atlas Copco Roto-injectfluid. This oil has a long service life and ensures optimum lubrication.

Notes
- Never mix oils of different brands or types.

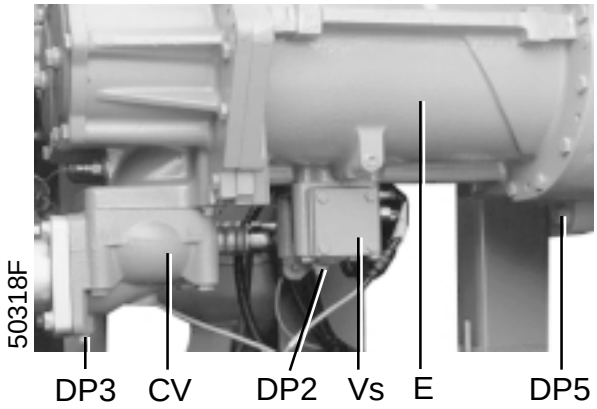
4.4 Oil change (Figs. 1a, 13 and 14b)

1. Run the compressor until warm. Stop the compressor and switch off the voltage. Wait a few minutes and depressurize by unscrewing plug (FC1) only one turn to permit any pressure in the system to escape.
2. Drain the oil by removing the drain plugs. Plugs are provided on the air receiver (DP1), oil stop valve (DP2) **2)**, check valve (DP3) **2)**, oil cooler (DP4) **3)** and gearbox (DP5). Tighten the plugs after draining.
3. Remove filler plug (FC1). Fill the air receiver with oil until the level reaches the filler neck. Reinstall and tighten plug (FC1).
4. Run the compressor loaded for a few minutes to allow the oil cooler by-pass valve(s) to open. Stop the compressor and wait a few minutes.
5. Depressurize the system by unscrewing plug (FC1) only one turn to permit any pressure in the system to escape. Remove filler plug (FC1). Fill the air receiver with oil until the level reaches the filler neck. Tighten plug (FC1).
6. Reset the oil service warning using key <<Reset>> in submenu <<Service>>. **1)**

4.5 Oil filter change (Figs. 1)

1. Stop the compressor, switch off the voltage and depressurize by unscrewing plug (FC1) only one turn to permit any pressure in the system to escape.
2. Remove oil filters (OF).

1) See "User manual for Elektronikon regulator", section "Submenu SERVICE".
2) On GA/GA W 200 up to -315 one plug for each valve.
3) Two plugs on GA W 132 up to -315.



CV. Check valve
DP2. Oil drain plug, oil stop valve
DP3. Oil drain plug, check valve
DP5. Oil drain plug, gear box
E. Compressor element
Vs. Oil stop valve

Fig. 13. Compressor element

3. Clean the filter seats on the manifold. Oil the gaskets of the new filters and screw them into place until the gaskets contact their seats, then tighten by hand.
4. Tighten filler plug (FC1).
5. Reset the oil filter service warning using key <<Reset>> in submenu <<Service>>. **1)**

4.6 Storage after installation

Run the compressor, e.g. twice a week, until warm. Load and unload the compressor a few times to operate the components of the unloading/loading system.

If the compressor is going to be stored without running from time to time, protective measures must be taken. Consult Atlas Copco.

1) See "User manual for Elektronikon regulator", section "Submenu SERVICE".

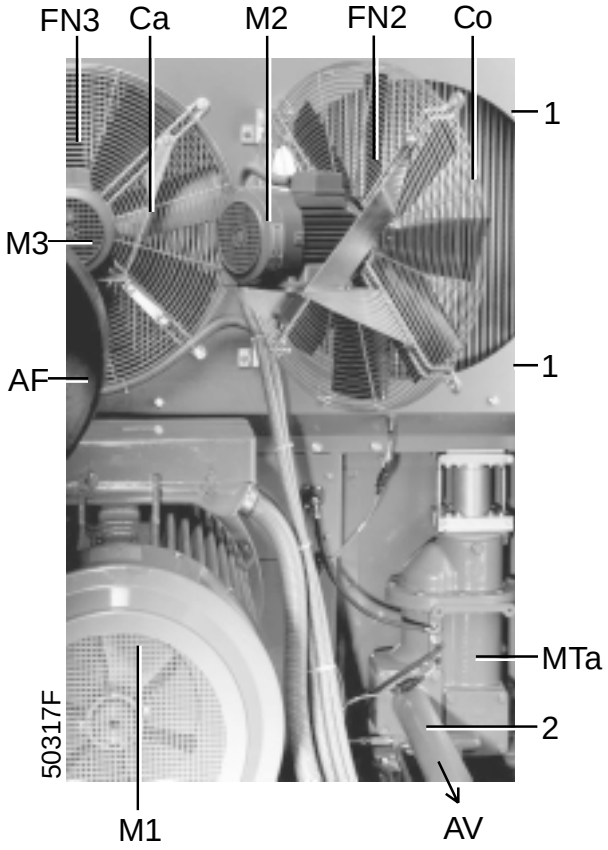


Fig. 14a GA

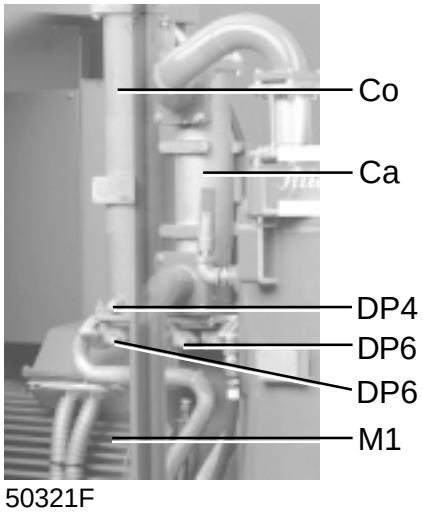


Fig. 14b GA W

AF. Air filter
AV. Air outlet valve
Ca. Air cooler
Co. Oil cooler
DP4. Oil drain plug
DP6. Water drain plugs
FN2/3. Fans
M1. Drive motor
M2/3. Fan motors
MTa. Moisture trap
1. Bolt
2. Air outlet pipe

Figs. 14. Drive motor and coolers (typical examples)

4.7 Service kits

Service kits
Service kits comprise all parts needed for servicing components and offer the benefits of genuine Atlas Copco parts while keeping the maintenance budget low. All service kits are mentioned in the relevant Parts Lists.

Service kit for oil filters	**Ordering number**
For GA/GA W 90 up to -160	2906 0170 00
For GA/GA W 200 up to -315 **1)**	2906 0199 00

Service kit for oil filters and air filters	**Ordering number**
For GA/GA W 90 up to -160	2906 0092 00
For GA/GA W 200 up to -315 **1)**	2906 0200 00

Service kit for oil filters and heavy-duty air filters	**Ordering number**
For GA/GA W 90 up to -160	2906 0285 00
For GA/GA W 200 up to -315 **1)**	2906 0288 00

Atlas Copco Roto-injectfluid
Atlas Copco Roto-injectfluid (see section 4.3.1) can be ordered in following quantities:

Quantity	**Ordering number**
20 litre can	2901 0522 00
209 litre drum	2901 0045 01

5 ADJUSTMENTS AND SERVICING PROCEDURES

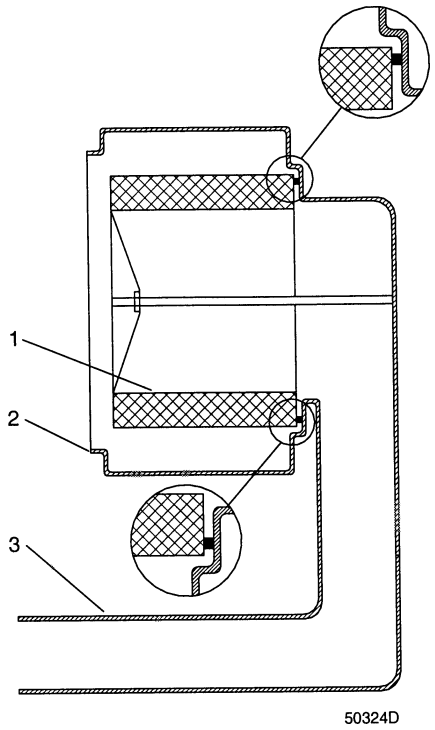
5.1 Air filters

1. Stop the compressor and switch off the voltage. Remove the filters. **2)**
2. Fit the new filters. Take care to fit the filters straight as shown in Fig. 15.
3. Reset the air filter service warning using key <<Reset>> in submenu <<Service>> **3).**

5.2 Coolers

Keep the coolers clean to maintain the cooling efficiency.

On GA, unscrew bolts (1-Fig. 14a) and rotate the fans away from the cooler block. Blow air from the compressor element compartment through the coolers towards the drive motor compartment. Remove any dirt. Reposition and fix the fans. Make sure that the fans rotate freely.



1. Filter
2. Filter chamber
3. Air inlet pipe

Fig. 15 Correct position of air filter

Note
If it should be necessary to wash the coolers with a cleansing agent, consult Atlas Copco.

On GA W, consult Atlas Copco for cleaning.

5.3 Safety valve (SV-Fig. 1a)

Operating
Operate the safety valve by unscrewing the cap one or two turns and retightening it.

Testing
The valve can be tested on a separate compressed air line. If the valve does not open at the pressure specified in section 7.3, consult Atlas Copco.

Warning
- Never run the compressor without safety valves.
- No adjustments are allowed.

1) On 13 bar and 200 psi compressors, consult the relevant Parts Lists for the part numbers of the filters
2) One filter on GA/GA W 90 up to -160, two filters on GA/GA W 200 up to -315.
3) See "User manual for Elektronikon regulator"

6 PROBLEM SOLVING

Warning
Before carrying out any maintenance or repair, press stop button (9-Fig. 3a), wait until the compressor has stopped (approx. 30 seconds) and then press emergency stop button (S2). Switch off the voltage and depressurize the compressor.

Take precautions to avoid an accidental restart. Apply all relevant safety precautions, including those mentioned in this book.

Faults and suggested remedies

1. **A service message appears on the display**
   Replace the indicated component or grease the drive motor as the case may be. Consult the "User manual for Elektronikon regulator" to remedy the trouble and to reset the message (section "Submenu SERVICE")

2. **A shut-down warning message appears on the display**
   LED (3-Fig. 3a) will light up indicating that the temperature at the outlet of the compressor element is too high. See below. The message disappears as soon as the cause of the trouble is remedied

3. **Unit is shut-down**
   LED (3-Fig. 3a) will blink indicating either that the outlet temperature is too high (see below) or that the motor overload relay has tripped. Consult the "User manual for Elektronikon regulator" to remedy the trouble and to reset the message (section "Submenu STATUS DATA")

4. **Condensate is not discharged from moisture trap during loading**
   a. Discharge pipe clogged
   a. Check and correct as necessary
   b. Float valve malfunctioning
   b. Remove float valve assembly, clean and check

5. **Compressor air delivery or pressure below normal**
   a. Air consumption exceeds air delivery of compressor
   a. Check equipment connected
   b. Choked air filters (AF)
   b. Replace filters
   c. Leaks in control air flexibles
   c. Replace flexibles
   d. Air leakages
   d. Check and correct

6. **Element outlet or delivery air temperature above normal**
   a. **On GA**, insufficient cooling air or cooling air temperature too high
   a. Check for cooling air restriction. Improve ventilation of compressor room. Avoid recirculation of cooling air
   b. **On GA W**, cooling water temperature too high or flow too low
   b. See section 7.5.2. Increase water flow
   c. Oil level too low
   c. Check and correct as necessary
   d. Oil cooler (Co) clogged
   d. Consult Atlas Copco
   e. Air cooler (Ca) clogged
   e. Consult Atlas Copco.
   f. On **GA W**, restriction in cooling water system due to dirt or formation of scale
   f. Consult Atlas Copco

7 PRINCIPAL DATA

7.1 Readings on display

Normally the main display (Fig. 3b) is shown, indicating the actual air outlet pressure and the actual compressor status. The key <<Show More>> allows the operator to call up other information about the condition of the compressor (see section 3.5.1).

The readings below are valid when operating at reference conditions (section 7.5.1):

Maximum unloading pressure	See section 7.5.3 up to 7.5.15
Compressor outlet pressure . .	Depends on programmed unloading and loading pressures
Pressure drop over air filter . .	Below 0.050 bar
Pressure difference over oil separator	Below 0.8 bar
Oil injection pressure at compressor element 1	Depends on programmed unloading and loading pressures
Compressor outlet temperature	See section 7.5.3 up to 7.5.15
Compressor element 1 outlet temperature	Between 70°C and 100°C
Cooling air inlet temperature **(on GA)**	Below 40 °C
Cooling water temperature **(on GA W)**	Below 50 °C

7.2 Programmable settings

A number of regulation settings (e.g. loading and unloading pressures), protection settings (e.g. shut-down level for the compressor element temperature) and service settings (e.g. oil service life) are programmable. The "User manual for Elektronikon regulator" deals elaborately with this matter (section "Submenu MODIFY SETTINGS").

7.3 Settings of safety valves

- 12 bar(e) for 7.5 bar, 10 bar, 100 psi, 125 psi and 150 psi versions
- 15 bar(e) for 13 bar and 200 psi versions

Important
Some compressors with a specific approval have valves with other settings. Always consult the data stamped on the valve or consult Atlas Copco.

7.4 Settings of overload relay, circuit breakers and fuses

7.4.1 Motor overload relay and fuses for GA/GA W - 50 Hz with ABB motors

GA/GA W Compressor type	Motor type M2CA	Supply voltage (V)	Max. setting of overload relay F21 (A)	Max. fuse ratings IEC Class gL/gG Type 2 **2)** (A)	Max. fuse ratings IEC Class gL/gG Type 1 **1)** (A)
90	280SMA-4	230	189	2x (3x200)	3x500
90	280SMA-4	400	107	3x200	-
90	280SMA-4	500	82	3x200	-
110	315SA-4	230	233	2x (3x300)	3x500
110	315SA-4	400	133	2x (3x160)	3x315
110	315SA-4	500	100	3x200	-
132	315SMB-4	230	274	2x (3x315)	3x500
132	315SMB-4	400	159	2x (3x200)	3x355
132	315SMB-4	500	121	3x224	-
160	315MB-4	230	339	2x (3x355)	3x800
160	315MB-4	400	191	2x (3x224)	3x400
160	315MB-4	500	145	2x (3x160)	3x315
200	315LA-4	400	230	2x (3x315)	3x500
200	315LA-4	500	178	2x (3x315)	3x500
250	355MA-4	400	292	2x (3x315)	3x500
250	355MA-4	500	223	2x (3x250)	3x500

7.4.2 Motor overload relay and fuses for GA/GA W - 60 Hz with ABB motors

GA/GA W Compressor type	Motor Type MC2A	Supply voltage (V)	Max. setting overload relay F21 (A)	Max. fuse ratings IEC Class gL(gG) (A) Type 2 **2)**	IEC Class gL(gG) (A) Type 1 **2)**	CSA HRC (A)	UL Class K5 (A)
90	445MB-4	220/230	204	2x (3x250)	3x500	2x (3x250)	2x (3x250)
90	445MB-4	380	119	3x224	--	--	--
90	445MB-4	440/460	102	3x200	--	3x200	3x175
90	445MB-4	575	79	--	--	3x200	3x175
110	505MA-4	220/230	257	2x (3x315)	3x500	2x (3x300)	3x300
110	505MA-4	380	149	2x (3x160)	3x315	--	--
110	505MA-4	440/460	129	2x (3x160)	3x315	2x (3x175)	3x175
110	505MA-4	575	98	--	--	3x200	3x175

1) Disturbance or destruction of contactor and/or overload relay may occur (if damaged, the component must be replaced)
2) No damage will occur at the overload relay

GA/GA W Compressor type	Motor Type MC2A	Supply voltage (V)	Max. setting overload relay F21 (A)	Max. fuse ratings IEC Class gL(gG) (A) Type 2 **1)**	IEC Class gL(gG) (A) Type 1 **1)**	CSA HRC (A)	UL Class K5 (A)
160	505MB-4	380	197	2x (3x224)	3x 500	--	--
160	505MB-4	440/460	169	2x (3x200)	3x 400	2x (3x200)	2x (3x200)
160	505MB-4	575	129	--	--	2x (3x175)	2x (3x175)
200	315LA-4	380	240	2x (3x315)	3x500	--	--
200	315LA-4	440/460	203	2x (3x315)	3x500	2x (3x250)	2x (3x250)
200	315LA-4	575	157	--	--	2x (3x250)	2x (3x250)
250	355MA-4	380	288	2x (3x315)	3x 500	--	--
250	355MA-4	440/460	253	2x (3x300)	3x500	2x (3x300)	2x (3x300)
250	355MA-4	575	194	--	--	2x (3x250)	2x (3x250)
315	355LA-4	380	319	2x (3x315)	3x630	--	--
315	355LA-4	440/460	279	2x (3x315)	3x500	2x (3x300)	2x (3x300)
315	355LA-4	575	216	--	--	2x (3x250)	2x (3x250)

7.4.3 Motor overload relay and fuses for GA/GA W - 60 Hz with Siemens motors (USA/Canada only)

GA/GA W Compressor type	Motor type	Supply voltage (V)	Max. setting of overload relay F21 (A)	Max. fuse ratings CSA HRC (A)	Max. fuse ratings UL Class K5 (A)
90	1LA6 283-4	220/230	208	2x (3x250)	2x (3x250)
90	1LA6 283-4	440/460	103	3x200	3x175
90	1LA6 283-4	575	79	3x200	3x175
110	1LA6 288-4	220/230	243	2x (3x300)	3x300
110	1LA6 288-4	440/460	125	2x (3x175)	3x175
110	1LA6 288-4	575	98	3x200	3x175
160	1LA6 316-4	440/460	163	2x (3x200)	2x (3x200)
160	1LA6 316-4	575	125	2x (3x175)	2x (3x175)
200	1LA6 317-4	440/460	205	2x (3x250)	2x (3x250)
200	1LA6 317-4	575	156	2x (3x250)	2x (3x250)
250	1LA8 315-4	440/460	243	2x (3x300)	2x (3x300)
250	1LA8 315-4	575	184	2x (3x250)	2x (3x250)
315	1LA8 317-4	440/460	281	2x (3x300)	2x (3x300)
315	1LA8 317-4	575	215	2x (3x250)	2x (3x250)

1) No damage will occur at the overload relay

7.4.4 Fan motor circuit breakers for GA - 50 Hz

GA Compressor type	Supply voltage (V)	Maximum setting of circuit breaker Q15 and Q16 (A)
90/160	230	12.5
90/160	400	7.2
90/160	440	6.6
90/160	500	5.4
200/250	230	15.8
200/250	400	9.1
200/250	500	7

7.4.5 Fan motor circuit breakers for GA - 60 Hz

GA Compressor type	Supply voltage (V)	Maximum setting of circuit breaker Q15 and Q16 (A)
90/160	220/230	11.5
90/160	380	6.6
90/160	440/460	6.3
90/160	575	4.5
200/315	220/230	20.3
200/315	380	11.7
200/315	440/460	10.4
200/315	575	8

7.5 Compressor specifications

7.5.1 Reference conditions

Absolute inlet pressure	bar(a)	1
Relative air humidity	%	0
Air inlet temperature	°C	20
Nominal effective working pressure	bar(e)	See sections 7.5.3 up to 7.5.15
Cooling water inlet temperature	°C	20

7.5.2 Limitations

Maximum air inlet temperature	°C	40
Minimum air inlet temperature	°C	0
Maximum effective working pressure	bar(e)	see sections 7.5.3 up to 7.5.15
Maximum cooling water inlet temperature	°C	40
Maximum cooling water outlet temperature (open systems)	°C	50
Maximum cooling water outlet temperature (recirculating systems)	°C	60
Maximum cooling water inlet pressure	bar(e)	5

7.5.3 Specific data of GA/GA W 90 up to -160 7.5 bar - 50 Hz 1)

Compressor type	90	110	132	160	90 W	110 W	132 W	160 W
Maximum working pressure . . bar(e)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Nominal working pressure . . . bar(e)	7	7	7	7	7	7	7	7
Air temperature at outlet valve, approx. . . . . °C	27	28	29	30	28	28	30	30
Motor shaft speed . . . . . r/min	1480	1485	1485	1485	1480	1485	1485	1485
Power input **3)** . . . . . kW	97	118	141	170	94	115	136	165
Oil capacity l	75	75	80	80	75	75	80	80
Sound pressure level **2)** . . . . . dB(A)	73	74	74	74	73	74	74	74
Cooling water flow at temperature rise of 10°C . . . . l/s	--	--	--	--	1.8	2.2	2.8	3.4

7.5.4 Specific data of GA/GA W 90 up to -160 10 bar - 50 Hz 1)

Compressor type	90	110	132	160	90 W	110 W	132 W	160 W
Maximum working pressure . . bar(e)	10	10	10	10	10	10	10	10
Nominal working pressure . . . bar(e)	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Air temperature at outlet valve, approx. . . . . °C	27	28	29	30	28	28	30	30
Motor shaft speed . . . . . r/min	1480	1485	1485	1485	1480	1485	1485	1485
Power input **3)** . . . . . kW	96	118	142	170	93	115	137	165
Oil capacity l	75	75	80	80	75	75	80	80
Sound pressure level **2)** . . . . . dB(A)	73	74	74	74	73	74	74	74
Cooling water flow at temperature rise of 10°C . . . . l/s	--	--	--	--	1.8	2.2	2.8	3.4

7.5.5 Specific data of GA/GA W 90 up to -160 13 bar - 50 Hz

Compressor type	90	110	132	160	90 W	110 W	132 W	160 W
Maximum working pressure . . bar(e)	13	13	13	13	13	13	13	13
Nominal working pressure . . . bar(e)	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Air temperature at outlet valve, approx. . . . . °C	27	28	29	30	28	28	30	30
Motor shaft speed . . . . . r/min	1480	1485	1485	1485	1480	1485	1485	1485
Power input **3)** . . . . . kW	93	114	141	171	91	111	136	166
Oil capacity l	75	75	80	80	75	75	80	80
Sound pressure level **2)** . . . . . dB(A)	73	74	74	74	73	74	74	74
Cooling water flow at temperature rise of 10°C . . . . l/s	--	--	--	--	1.8	2.2	2.8	3.4

1) At reference conditions (see section 7.5.1)
2) According to PNEUROP/CAGI at 1 m distance under free field conditions with a tolerance of 3 dB
3) For GA including cooling fans. Values may differ up to 0.5% depending on the supply voltage

7.5.6 Specific data of GA/GA W 90 up to -160 100 psi - 60 Hz 1)

Compressor type		90	110	160	90 W	110 W	160 W
Maximum working pressure	bar(e)	7.4	7.4	7.4	7.4	7.4	7.4
Nominal working pressure	bar(e)	6.9	6.9	6.9	6.9	6.9	6.9
Air temperature at outlet valve, approx.	°C	27	28	30	28	28	30
Motor shaft speed	r/min	1785	1790	1790	1785	1790	1790
Power input **3)**	kW	108	129	176	104	125	169
Oil capacity	l	75	75	80	75	80	80
Sound pressure level **2)**	dB(A)	76	77	78	74	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	--	2.0	2.4	3.4

7.5.7 Specific data of GA/GA W 90 up to -160 125 psi - 60 Hz 1)

Compressor type		90	110	160	90 W	110 W	160 W
Maximum working pressure	bar(e)	9.1	9.1	9.1	9.1	9.1	9.1
Nominal working pressure	bar(e)	8.6	8.6	8.6	8.6	8.6	8.6
Air temperature at outlet valve, approx.	°C	27	28	30	28	28	30
Motor shaft speed	r/min	1785	1790	1790	1785	1790	1790
Power input **3)**	kW	108	129	174	104	125	166
Oil capacity	l	75	75	80	75	80	80
Sound pressure level **2)**	dB(A)	76	77	78	74	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	--	2.0	2.4	3.4

7.5.8 Specific data of GA/GA W 90 up to -160 150 psi - 60 Hz 1)

Compressor type		90	110	160	90 W	110 W	160 W
Maximum working pressure	bar(e)	10.8	10.8	10.8	10.8	10.8	10.8
Nominal working pressure	bar(e)	10.3	10.3	10.3	10.3	10.3	10.3
Air temperature at outlet valve, approx.	°C	27	28	30	28	28	30
Motor shaft speed	r/min	1785	1790	1790	1785	1790	1790
Power input **3)**	kW	109	128	173	105	124	165
Oil capacity	l	75	75	80	75	75	80
Sound pressure level **2)**	dB(A)	76	77	78	74	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	--	2.0	2.4	3.4

1) At reference conditions (see section 7.5.1)
2) According to PNEUROP/CAGI at 1 m distance under free field conditions with a tolerance of 3 dB
3) For GA including cooling fans. Values may differ up to 0.5% depending on the supply voltage

7.5.9 Specific data of GA/GA W 90 up to -160 200 psi - 60 Hz 1)

Compressor type		90	110	160	90 W	110 W	160 W
Maximum working pressure	bar(e)	13.8	13.8	13.8	13.8	13.8	13.8
Nominal working pressure	bar(e)	13.3	13.3	13.3	13.3	13.3	13.3
Air temperature at outlet valve, approx.	°C	27	28	30	28	28	30
Motor shaft speed	r/min	1785	1790	1790	1785	1790	1790
Power input **3)**	kW	108	128	178	104	125	171
Oil capacity	l	75	75	80	75	75	80
Sound pressure level **2)**	dB(A)	76	77	78	74	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	--	2.0	2.4	3.4

7.5.10 Specific data of GA/GA W 200 and -250 7.5 bar - 50 Hz 1)

Compressor type		200	250	200 W	250 W
Maximum working pressure	bar(e)	7.5	7.5	7.5	7.5
Nominal working pressure	bar(e)	7	7	7	7
Air temperature at outlet valve, approx.	°C	30	30	30	30
Motor shaft speed	r/min	1490	1490	1490	1490
Power input **3)**	kW	215	267	207	260
Oil capacity	l	125	125	125	125
Sound pressure level **2)**	dB(A)	75	75	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	3.9	4.9

7.5.11 Specific data of GA/GA W 200 and -250 10/13 bar - 50 Hz 1)

Compressor type		200	250	200 W	250 W	250	250 W
Maximum working pressure	bar(e)	10	10	10	10	13	13
Nominal working pressure	bar(e)	9.5	9.5	9.5	9.5	12.5	12.5
Air temperature at outlet valve, approx.	°C	30	30	30	30	30	30
Motor shaft speed	r/min	1480	1485	1490	1490	1490	1490
Power input **3)**	kW	211	266	203	259	273	265
Oil capacity	l	125	125	125	125	125	125
Sound pressure level **2)**	dB(A)	75	75	75	75	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	3.9	4.9	--	4.9

1) At reference conditions (see section 7.5.1)
2) According to PNEUROP/CAGI at 1 m distance under free field conditions with a tolerance of 3 dB
3) For GA including cooling fans. Values may differ up to 0.5% depending on the supply voltage

7.5.12 Specific data of GA/GA W 200 up to -315 100 psi - 60 Hz 1)

Compressor type		200	250	315	200 W	250 W	315 W
Maximum working pressure	bar(e)	7.4	7.4	7.4	7.4	7.4	7.4
Nominal working pressure	bar(e)	6.9	6.9	6.9	6.9	6.9	6.9
Air temperature at outlet valve, approx.	°C	30	30	30	30	30	30
Motor shaft speed	r/min	1790	1790	1790	1790	1790	1790
Power input **3)**	kW	223	267	292	210	254	279
Oil capacity	l	125	125	125	125	125	125
Sound pressure level **2)**	dB(A)	78	78	78	75	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	--	3.9	4.8	5.3

7.5.13 Specific data of GA/GA W 200 up to -315 125 psi - 60 Hz 1)

Compressor type		200	250	315	200 W	250 W	315 W
Maximum working pressure	bar(e)	9.1	9.1	9.1	9.1	9.1	9.1
Nominal working pressure	bar(e)	8.6	8.6	8.6	8.6	8.6	8.6
Air temperature at outlet valve, approx.	°C	30	30	30	30	30	30
Motor shaft speed	r/min	1790	1790	1790	1790	1790	1790
Power input **3)**	kW	222	265	296	209	252	283
Oil capacity	l	125	125	125	125	125	125
Sound pressure level **2)**	dB(A)	78	78	78	75	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	--	3.9	4.8	5.3

7.5.14 Specific data of GA/GA W 200 up to -315 150 psi - 60 Hz 1)

Compressor type		200	250	315	200 W	250 W	315 W
Maximum working pressure	bar(e)	10.8	10.8	10.8	10.8	10.8	10.8
Nominal working pressure	bar(e)	10.3	10.3	10.3	10.3	10.3	10.3
Air temperature at outlet valve, approx.	°C	30	30	30	30	30	30
Motor shaft speed	r/min	1790	1790	1790	1790	1790	1790
Power input **3)**	kW	226	263	295	213	250	282
Oil capacity	l	125	125	125	125	125	125
Sound pressure level **2)**	dB(A)	78	78	78	75	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	--	3.9	4.8	5.3

1) At reference conditions (see section 7.5.1)
2) According to PNEUROP/CAGI at 1 m distance under free field conditions with a tolerance of 3 dB
3) For GA including cooling fans. Values may differ up to 0.5% depending on the supply voltage

7.5.15 Specific data of GA/GA W 250 and -315 200 psi - 60 Hz 1)

Compressor type		250	315	250 W	315 W
Maximum working pressure	bar(e)	13.8	13.8	13.8	13.8
Nominal working pressure	bar(e)	13.3	13.3	13.3	13.3
Air temperature at outlet valve, approx.	°C	30	30	30	30
Motor shaft speed	r/min	1790	1790	1790	1790
Power input **3)**	kW	272	292	259	279
Oil capacity	l	125	125	125	125
Sound pressure level **2)**	dB(A)	78	78	75	75
Cooling water flow at temperature rise of 10°C	l/s	--	--	7.8	5.3

7.6 Conversion list of SI units into British/US units

1 bar = 14.504 psi
1 g = 0.035 oz
1 kg = 2.205 lb
1 kW = 1.341 hp (UK and US)
1 l = 0.264 US gal
1 l = 0.220 Imp gal (UK)
1 l = 0.035 cu.ft
1 l/s = 2.117 cfm
1 mm = 0.039 in
1 mbar = 0.401 in water column
1 N = 0.225 lbf
1 Nm = 0.738 lbf.ft x °C = (32 + 1.8 x) °F **4)**

1) At reference conditions (see section 7.5.1)
2) According to PNEUROP/CAGI at 1 m distance under free field conditions with a tolerance of 3 dB
3) For GA including cooling fans. Values may differ up to 0.5% depending on the supply voltage
4) A temperature difference of 1°C = a temperature difference of 1.8°F